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THE

DOMESTIC ENCYCLOPÆDIA;

OR, A

DICTIONARY OF FACTS,

AND

USEFUL KNOWLEDGE:

COMPREHENDING

A CONCISE VIEW OF THE LATEST DISCOVERIES,
INVENTIONS, AND IMPROVEMENTS, CHIEFLY
APPLICABLE TO RURAL AND DOMESTIC ECONOMY;

TOGETHER WITH

DESCRIPTIONS OF THE MOST INTERESTING OBJECTS OF NATURE AND ART;
THE HISTORY OF MEN AND ANIMALS, IN A STATE OF HEALTH OR
DISEASE; AND PRACTICAL HINTS RESPECTING THE ARTS AND
MANUFACTURES, BOTH FAMILIAR AND COMMERCIAL.

Illustrated with numerous Engravings and Cuts.

IN FOUR VOLUMES.

VOLUME SECOND.

BY

A. F. M. WILLICH, M. D.

AUTHOR OF THE LECTURES ON DIET AND REGIMEN, &c. &c.

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II. Rev. J. Cook's Drill Machinery, p. 168.
III. and IV. Dr. Darwin's and Mr. Swanwick's Improvements of the Drill Plough, Pl. I. p. 172.—Pl. II. p. 178.
V. Instruments for recovering the Drowned, p. 189.
VI. Implements of Restoration from Drowning, p. 190.
VII. American Fire-engine, p. 284.

ERRATA ET CORRIGENDA.

Page 78, Col. 2, line 5, and 6, dele, of New North-street, Red Lion-square; and read, No. 10, Soho-square.
—— 116, —— 2, —— 43, for *Leuciscus cyprinus*, read, *Cyprinus leuciscus*.
—— 141, —— 1, —— 16, for Corn-fly, read Corn Butterfly; p. 68.
—— 146, —— 2, —— 39, for LAND, read, LAND-DITCHING.
—— 163, —— 1, —— 49, for MOREHOUSE, read MIREHOUSE.
—— 286, —— 1, —— 33, read blunderbusses.
—— 316, —— 1, —— 49, for *vesicatorious*, read, *vesicatorius*.
—— 376, —— 1, —— 35, for person, read, persons.
—— 447, —— 2, —— 22, read, see Red Poppy.

THE

DOMESTIC ENCYCLOPÆDIA.

CITRON, or *Citrus*, L. an exotic genus of plants, comprising six species; of which the following are occasionally reared in hot-houses:

1. The *Medica*, or Citron-tree, which is a beautiful evergreen, rises from five to ten feet in height, and forms a full head, thickly set with leaves. It is very luxuriant in its vegetation, shooting forth a profusion of sweet flowers in the spring, and early in the summer, which are frequently succeeded by an abundance of fruit, that arrives, sometimes, at tolerable perfection.

This species is originally obtained by seed; but the most certain method of propagating it, is by *budding* it on stocks raised from seeds to a proper size. These may be sown, in March, in pots of rich light earth, half an inch deep, and plunged in a hot-bed under frames and glasses, being occasionally watered. Towards the middle of June, they may be exposed to the open air, in which they should remain till October, when they are to be removed to the green-house till the ensuing spring. In the month of March, or April, following, they will be fit to be transplanted, singly, in small pots, care being taken to water them immediately after that operation is performed, and to repeat it when necessary; so that, in the course of a year, or two, the largest of those designed for stocks will be fit for budding. Previously to their being planted, they must be set for a day or two in tubs of water, to *plump* their bark and roots. Next, they should be washed and cleaned, the roots freed from diseased parts and all the small dried fibres. They are then to be planted in pots filled with light earth, and plunged in a tan-bed, where they should remain for three or four months; after which they may be exposed to the open air, but will bear it only from the end of May to the middle of October.

The fruit of the citron-tree yields a very agreeable acid, which is of considerable utility in medicine, particularly as an antiscorbutic.—See LEMON-JUICE.

There is another variety of this species, growing abundantly in the British West India Islands, producing a spherical fruit of a much smaller size than the lemon, and containing an acid juice, in a more concentrated state.—See LIMES.

2. The *Aurantium*. See ORANGE.

3. The *Decumana*, or the Giant Citron, which is common in the East and West Indies, and pro-

duces a fruit, sometimes 14lb. in weight, containing a sweet pulp, and small compartments in the centre, which abound with a subacid vinous juice. As it requires nearly two years to arrive at maturity, in the climate of Europe, it is seldom cultivated.

CLARIFICATION, is the act of clearing or fining liquids from heterogeneous or feculent ingredients. For this purpose, the whites of eggs, blood, and isinglass, are usually employed: the two first, for clarifying liquors, while boiling hot; the last, for those which are to be fined when cold; as wine, ale, &c. The whites of eggs are beaten up into a froth, mixed with the liquor, and united with the impure particles floating on it; which soon indurate, and are carried up to the surface, in the form of an insoluble scum. Blood operates in a similar manner, and is principally used in the processes of refining salt and sugar.

Great quantities of isinglass are consumed in fining turbid wines. A solid piece, about a quarter of an ounce in weight, is put into a cask of wine, where it gradually dissolves, and forms a skin upon the surface: this pellicle at length subsides, carrying down with it the feculent matter that floated on the wine. Other vintners previously dissolve the isinglass; and, having boiled it down to a gelatinous consistence, mix it with the liquor, strongly agitate the cask, and then let it stand to settle. It deserves, however, to be remarked, that wines treated in this manner are tainted with a very putrescent animal substance, and cannot be wholesome.

CLARY, or *Salvia*, L. is a genus of native plants, producing two species:

1. The *Pratensis*, or Meadow-Clary, which grows in dry pastures, and is found principally in the counties of Surrey and Sussex. It is perennial; flowers in the months of June and July; and its leaves are slightly aromatic. When soaked in water for a few minutes, its seeds acquire a mucilaginous coat, somewhat similar to the spawn of frogs. BECHSTEIN observes, that this plant, when used as a substitute for hops, imparts an agreeable flavour to beer and wine; but, at the same time, renders them more intoxicating, and pernicious to health. It may, however, be more usefully employed in tanning leather, and dyeing a permanent dark brown.

2. The *Verbenaca*, or Wild English Clary, which is also perennial, grows in gravelly, calcareous soils, and blows from June to October. This species is smaller than the preceding, but more aromatic. Its seeds, when immersed in water, possess the property of the pratensis, in a superior degree.

Both the leaves and seeds of this plant have a warm, bitterish, pungent taste, and a strong, though not agreeable, odour. They are principally recommended in hysteric disorders, and in flatulent colics.

CLARY-WATER is composed of brandy, sugar, clary-flowers, and cinnamon, in which a little ambergris is dissolved. It is also prepared with brandy, juice of cherries, straw-berries and goose-berries, cloves, white pepper, and coriander-seeds; the whole of which are infused, sweetened, and strained.—This medicated water is said to assist digestion, and to be "an excellent cardiac;" but we have reason to apprehend that it is, like all other *cordials*, calculated to increase the catalogue of tipplers, rather than to promote the purposes of health.

CLAY is a compact, heavy, stiff, viscid, and ductile earth, when moist, which is easily dissolved, and, when mixed with water, does not readily subside.

For promoting the vegetation of many plants, clay is a necessary ingredient in the soil, with the exception of those species called *argilla aërata*, or *lac lunæ*, and *argilla apyra*, or porcelain, and other white, fermenting clays, for which no use has hitherto been discovered in agriculture. By its cohesion, clay retains humidity, on which, perhaps, its fertilizing property chiefly depends.

In its pure state, clay is unfit for the purposes of vegetation, on account of the great adhesion of argillaceous particles, which cannot be penetrated by the tender fibres of roots; but, when mixed with calcareous earth, and siliceous sand, or marl, it is much improved, and of great use in tillage.

It is commonly believed, that lumps of clay, in a moist state, may be rendered more friable, by exposing them to frost; which, by expanding the water they contain, and converting it into ice, is supposed to cause a farther separation of the clayey particles. This notion, however, appears to be erroneous; for, unless the frost be very sudden, it will probably be attended with a contrary effect. Mr. KIRWAN observes, that clay, in its dry state, absorbs more than twice its weight of water, before it parts with that fluid, and retains it, in the open air, more tenaciously than other earths; but, in a freezing cold, clay contracts more than other soils, and, as it were, squeezes out its water in a greater than usual proportion.

As clay, by the great cohesion of its particles, is not well adapted to the growth of roots, Dr. DARWIN remarks, that it may, in some degree, be corrected, by frequently exposing the air confined in its interstices; for instance, by turning it over with the plough, or spade. Another method is, by planting, in a clayey soil, first, those vegetables which are known to thrive in it, such as beans; and if their roots be afterwards left to putrify in the clay, they render the mass less cohesive, and enrich, rather than impoverish, the land. When clay abounds with vitriolic acid, so as to be convertible into alum, it becomes very unfavourable to vegetation, and checks the growth of trees, as well as of herbaceous plants, by corroding the fine extremities of their roots. This injurious quality may be most effectually remedied, in gardens, by wood-ashes, or soap-suds; and, in fields, by mixing with such clay, lime, powdered chalk, or the sweepings of roads consisting of limestone.

CLAY-LANDS, are those which abound with clay, whether black, blue, white, &c.; of which, the black and yellow are the best for corn.

All clay soils, as they retain too much water, are apt to chill the plants in moist seasons; on the contrary, in dry weather, they become hard, and obstruct vegetation. They naturally produce weeds, goose-grass, thistles, poppies, &c.; but some will yield clover and rye-grass; and, if well manured, bear the best grain. Such soils are more advantageously manured than any other lands: the most proper that can be selected for this purpose, is horse or pigeons' dung, malt-dust, chalk, &c.

Clay-ground is naturally steril; because it adheres together in masses. This defect may, however, be remedied, by mixing with it burnt clay; which tends to correct the cold nature of the soil, and will, by proper tillage, yield most excellent crops.

A remarkable instance of rural industry, in rendering a wet clayey soil uncommonly productive, occurs in the 28th volume of the *Annals of Agriculture.* The land was two perches in width, and gently arched up, so that the crown of the ridge was about 2, or 2½ feet higher than the bottom of the furrow. These ridges were gently rounded off, so as to describe the form of a segment of a very large circle, then disposed into double beds, and well manured. The fertility of the soil was farther promoted, by adapting the course of crops to its nature; namely, by sowing, 1st, beans; 2d, wheat; and, 3d, clover. In this succession, the beans were set upon a *clover-lay*, which saved much time, in preparing the land after the common way; and being sown just before, or immediately after, Christmas, they were ready to be hoed in the dry weather, usually occurring towards the end of February, or the beginning of March: by this management, they were brought so forward, that they could be cut in July or August. It is an error in agriculture, that beans cannot be left too long on the ground. They should be harvested while most of the pods are quite green; by which means a fine sample is secured, and the straw rendered incomparably better. After the beans, wheat was sown; and over that, in the month of March, or April, from 15 to 20lbs. of clover-seed per acre, which, in the following year, was mown twice for hay. These crops are particularly valuable on strong soils, where oats and barley never thrive well; and even if a large crop of either should be raised, it would be of a very inferior quality. Hence we recommend a similar course to be pursued, as the labour and expence necessarily incurred, will be amply compensated by perseverance and industry.

CLEAVERS, or Clivers. See Goose-Grass.

CLIFF-KALE, or Sea-Kale. See Sea-Colewort.

CLERGY, Benefit of, is an ancient privilege, by which a person in holy orders may claim to be delivered to his ordinary, to purge himself of felony. It was formerly confined exclusively to the clergy, but has been extended, since the Reformation, to the laity. Accordingly, by the 1 Edw. VI. c. 12, all Lords of Parliament, and Peers of the Realm, shall be discharged, in all clergyable and other felonies, provided for by the act, without being burnt in the hand, or transported—or at most being imprisoned only for one year—in the same manner as real clerks convict are. By the same act, all the commons, not in orders, whether male or female, shall, for the first offence, be discharged of the punishment of felonies, within the benefit of clergy, on being burnt in the hand, and suffering a discretionary imprisonment; or, in case of larceny, on being transported for seven years, if the court shall think proper.

CLIMATE, is a term usually given to any country or region, that differs from another, as well with respect to the seasons and quality of the soil, as to the manners of its inhabitants.

The climate of this country, though in general temperate, is extremely variable. The transitions from heat to cold, however sudden in Britain, are less severely felt than upon the Continent. Yet these frequent changes are productive of many diseases, which, according to Dr. C. Bisset, are generated chiefly by the following causes: 1. From the cold and moist temperature of the air, consequent on a long course of weather, that was either dry and sultry, or warm, close, and moist; or intensely cold and dry, together with keen frost; and from the effects produced by the contrary temperature. 2. From cold and frosty weather, with piercing north, or east winds, after a long course of mild weather, with south winds, which again prevail after the opposite extremes, and produce a moist and temperate, or warm air: and 3. From cold weather during summer, and unseasonably warm or mild weather, together with south winds, in winter, and again attended with the contrary changes.

This island is peculiarly subject to showers, and to close, cloudy, foggy weather; which must be ascribed to its insular situation. Clouds are continually wafted over from the sea, by every wind, and condensed by the cold land-air, as also by the humid vapours arising from plants, and thus precipitated in rain. From this circumstance, an uninterrupted continuance of dry weather is seldom experienced in Great Britain. But, though such frequent changes, together with the moist and cold air so generally prevalent, render the inhabitants of this country liable to many disorders, yet the more malignant epidemics are less fatal, and occur less frequently, than in most continental regions; because we enjoy the benefit of pure and temperate sea-winds, and are exempt from the two extremes of heat and cold. The moisture of the British air, indeed, tends to relax the fibres; but it also promotes accretion, while its cool temperature condenses the solids, and invigorates the whole body. Hence it happens, that the natives of Great Britain are, in general, stouter, and more robust than those of other countries; and, though many persons here are subject to scorbutic and rheumatic complaints, arising from these various causes, to which must be added their gross and solid, or luxurious food, yet a far greater proportion of the inhabitants of this island lives to an advanced age, than of those of any continental country. This assertion, however, chiefly relates to salubrious farms and villages, where the people are more temperate, and less debauched by spirituous liquors, than in towns. We may farther remark, that the prevailing custom of wearing light and thin dresses, especially among females, is by no means conducive to longevity; for, as those votaries of fashion and caprice are, in all seasons, exposed to colds and rheumatic complaints, many of them at length contract pulmonary, or consumptive diseases, and fall victims of folly, at a period of life when they ought to be most useful to society.

The solid, nutritive food of the inhabitants, in general, is likewise a principal cause of many diseases originating from repletion; yet it must at the same time be admitted, that such substantial nutriment greatly contributes to their strength, their full, athletic size, and florid complexion.—Those of our readers, who wish to acquire additional information on this subject, we refer to Dr. W. Falconer's elaborate "*Remarks on the Influence of Climate, Situation, Nature of Country, Population, Nature of Food, Way of Life: on the Dispositions and Temper, Manners and Behaviour, Intellects, Laws and Customs, Forms of Government, and Religion of Mankind*" (4to. 18s. Dilly—Mawman, 1781), in which this interesting topic is minutely and ingeniously discussed.

Clock. See Time-piece.

CLOSE-STOOL, a chamber implement of considerable utility to patients and invalids; though it has lately been in a great measure superseded by the invention of *water-closets*. These, however, being attended with such expence as to preclude many families from their acquisition, it may be useful to mention an easy method of suppressing the fetid exhalation arising from vessels of the former description, when kept in sick-rooms, especially during the night. A foreign writer suggests the following expedient: Take a handful (we suppose, three or four ounces) of green vitriol; dissolve it in half a gallon of boiling water; and, when cold, pour a quart of it on the feces immediately after each stool. In this simple manner, we are informed, the most unpleasant stench will be effectually neutralized; a circumstance of great importance in putrid and malignant fevers.

Clot-burr. See Burdock.

CLOTH, in commerce, a manufacture made of wool, cotton, flax, hemp, &c. woven in a loom. In this place, however, we shall treat only of woollen cloths: these are of various qualities, fine or coarse, which depend on a variety of circumstances.

The best wools for manufacturing cloth are those of England and Spain, especially of Lincolnshire and Segovia. In order to use them to the best advantage, they should be previously scoured, in a hot liquor consisting of three parts of pure water, and one of urine. When it has soaked a sufficient time in this liquor, to dissolve the grease, it is drained, and properly washed in running water: as soon as it feels somewhat rough, and is divested of all smell, except the natural one of the sheep, it is said to be properly *scoured*. The wool is next exposed to dry completely in the shade; after which it is beaten with rods upon wooden hurdles, or on cords, to cleanse it from the dust and grosser filth, and prepare it for spinning, when it must be well picked, in order to separate the remaining impurities.

After this process, it is oiled with oil of olives, and given to the spinners, who first card it on the knee with small fine cards, and then spin it on a wheel; care being taken to make the thread of the warp one third less than that of the woof, and to twist the former more compactly. The thread is then reeled, and formed into skeins: that designed for the warp is wound on small tubes, pieces of paper, or rushes, so disposed that they may be easily put in the eye of the shuttle; that intended for the warp is wound on large wooden bobbins. As soon as it is warped, stiffened with size, and dried, it is mounted on the loom. The weavers, of whom there are two to each loom, tread alternately, on the right, and on the left step of the treddle, which raises and lowers the threads of the warp equally; between which latter they throw the shuttle transversely, the one to the other. Every time the shuttle is thrown, and a thread of the woof inserted in the warp, they strike it jointly with the same frame: to this is attached the comb, or reed, through the teeth of which the threads of the warp have been previously passed; the blow being repeated as often as is necessary. Having filled the whole warp with the woof, the cloth is unrolled from the beam on which it had been wound while weaving, and given to be cleansed from the knots, ends of thread, &c.; an operation which is usually performed with iron nippers,

In this state it is carried to the fullery, and scowered with urine, or with a species of potters' clay steeped in water. As soon as the cloth is again cleared from the earth or urine, it is returned to the former hands, for taking off, as before, the smaller straws, &c.; when it is delivered to the fuller, to be beaten and fulled with hot water, in which a proper quantity of soap has been dissolved. After this second fulling, it is smoothed, or pulled lengthways by the lists, in order to take out all wrinkles and unevenness. This operation is continued till the cloth is brought to a proper breadth, when it is washed in clear water, to cleanse it from the soap, and afterwards given wet to the carders, to raise the hair, or nap, with the teasel (*Dipsacus fullonum*, L.) The cloth-worker then takes it in hand, and performs what is called, the *first shearing*, after which it is again delivered to the carders, who pass it repeatedly under the teasel, in proportion to the quality of the stuff. It is next returned to the cloth-worker, and from him to the carders, where the same operation is continued till the nap on the surface be properly ranged.

Thus prepared, the cloth is sent to the dyer, who, after having given it the proper colour, immerses it in pure water, and delivers it, while wet, to the worker. The latter lays the nap with a brush on the table; and then suspends it on tenters, where it is sufficiently stretched, and brushed while wet, in order to bring it to its proper dimensions. As soon as it is completely dried, it is again brushed on the table, to finish the laying of the nap; after which it is folded, and laid cold under a press, to make it smooth, and to give it a gloss. When it is taken out of the press, and the papers for glossing it are removed, the cloth is fit for immediate sale, or use.

With respect to the manufacture of mixed cloths, or those in which the wools are dyed previously to their being wrought, the process varies but little from that just described, except in what relates to the colour.

Cloth, in general, constitutes one of the most necessary articles of domestic convenience: hence many ingenious persons have attempted to discover substitutes for Flax and Hemp, of which we shall give a short account, in their alphabetical order.

Woollen cloths being liable to be stained, or soiled, by a variety of accidents, different methods have been contrived to remove such spots, and thus restore the cloth to its former beauty. When stained with grease, fullers' earth, pure pot-ash, or other absorbents, will produce the desired effect. Spots of ink, or other stains, may be taken out by the acid of sorrel, or the oxalic acid (essential salt of lemons), and the colour restored by alkalies, or by a solution of tin. It frequently happens, however, that spots are owing to different unknown causes, which render it necessary to recur to compositions possessing various powers. For this purpose, CHAPTAL recommends white soap to be dissolved in alcohol: in this solution are to be mixed the yolks of four or five eggs, to which should be gradually added, some spirit of turpentine and fullers' earth, in such proportions as to give the whole mixture, when stirred, a due consistence for being formed into balls. The spots, after being wetted, are to be rubbed with these balls; when the cloth also should be well washed, and cleansed. Thus, every kind of spots (those of ink, or other solutions of iron excepted) may be effectually removed.

In February, 1796, a patent was granted to Mr. JOHN GRIMSHAW, of Strines-hall, Derbyshire, calico-printer, for his invention of certain substances to be used in clearing, or bleaching, printed, stained, or dyed woollen, and other cloths. The principal ingredient employed by the patentee appears to be, the common grains which remain after brewing, and which are put into a close vessel, in order to become sour. This is usually effected in six days in hot, and in about eight days, in cold weather. As soon as the grains have acquired the necessary degree of acidity, three or four bushels of them are directed to be put into a common-sized calico-printer's copper pan, nearly full of water. Into this mixture the stained cloths are repeatedly immersed, and turned over a winch or reel placed across the pan. The operation is continued from five to fifteen minutes, during which the mixture is directed to boil gently; the pieces are then taken out, and washed immediately, either in hot or cold water, and treated in the same manner as goods that are cleared with bran. When twelve or sixteen pieces have been thus cleaned, an additional bushel of sour grains is to be added, and the pan filled up with water: when it boils, the operation may be repeated with other cloths, as before.—See BLEACHING.

CLOTHES. See MOTHS.

CLOTWEED. See BURDOCK the Lesser.

CLOUD-BERRY, or MOUNTAIN BRAMBLE, the *Rubus chamœmorus*, L. an indigenous species of the raspberry-bush, which grows in peat-bogs, and on the sides of mountains: it is found chiefly in the counties of York, Westmoreland, Cumberland, Lancaster, and Caernarvon.

This plant seldom exceeds one foot in height, produces white blossoms in the month of May or June, and afterwards red berries. These are not unpleasant to the taste, and are frequently brought to the table with the desert, in the Highlands of Scotland, as well as in the more northern parts of Europe, where they are reputed to be an excellent antiscorbutic.

CLOVE, a term used in weighing wool, consisting of 7lbs. In Essex, 8lbs. of cheese or butter make a *clove*.

CLOVE-PINK, or CARNATION, the *Dianthus caryophyllus*, L. belongs to a genus of plants comprising twenty-eight species; of which six only are natives.—The carnation, in its wild state, grows on old walls, and is found among the ruins of ancient castles. It usually flowers in the month of June or July.

Although clove-pinks will thrive in almost any garden soil, yet they delight most in those of a light loamy nature. They are propagated chiefly by seed, in March or April, and generally come up in a month after sowing. When properly weeded and watered till July, they will be fit for transplanting into nursery-beds, which should be about three feet wide, and in an open situation. In these beds, the plants are to be *pricked* during moist weather, at the distance of four inches from each other, and moderately watered; which should be occasionally repeated, till they have taken good root. In September, they will be fit to be finally transplanted into other beds of good earth, about three feet wide, in rows nine inches asunder. Here they are to remain till spring; but if the winter prove very severe, they should be sheltered with mats. In the vernal season, they ought to be carefully weeded with a hoe, and the flower-stalks must be tied up to sticks, in order to prevent their drooping, by which their growth would be retarded.

Clove-pinks have a pleasant aromatic odour, and are said to be cardiac and alexipharmic. A decoction of these flowers has been successfully used in malignant fevers; and, as PAULLI asserts, they raise the animal spirits, quench thirst, and powerfully promote both perspiration and the secretion of urine, without occasioning great irritation.

CLOVER, a species of trefoil, or *Trifolium*, L. a genus of plants comprising 55 species, of which only 16 are indigenous: of these the following are the principal.

1. The *pratense*, or common clover, which is frequently found in meadows and pastures. This species thrives best on a firm heavy soil, and is raised from seed, which is usually sown between the months of February and May, in the proportion of ten or fifteen pounds per acre. If it be often sown on the same land, the crop will fail; it should therefore be changed for trefoil or lucerne.

Common clover is usually sown together with wheat, in the spring, as well as with barley and oats; but experienced farmers generally prefer wheat; as, in dry seasons, the clover frequently overpowers the oats or barley; and, if it be sown late in order to obviate this evil, it often fails, and the crop is lost for that season. It is also mixed with rye-grass; and, if mown when the latter is beginning to flower, the lower growth is considerably increased, and a great quantity of excellent grass is obtained. Another advantage arises from this expedient; for, however severe the frost may be, the clover will be completely screened from its piercing effects by the rye-grass.

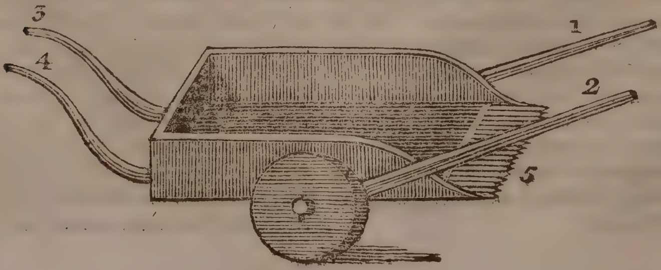
The common clover is in flower from May to September, and produces seeds which are known to be ripe by the stalks and heads changing their colour. Cattle, sheep, and pigs are exceedingly fond of this species, and frequently eat of it so eagerly as to become *hoven* or *blown*. That disorder, however, may be prevented by constantly moving them about the field, when turned in, so that the first ball may sink into their maw before the next be deposited. Or, if cattle be turned into clover belly-deep, they will, it is said, receive no injury by eating too freely of it; as it is pernicious only in its earlier state. Should they, nevertheless, be attacked with that dangerous swelling, they may be relieved by adopting the remedies pointed out under the article Cattle, vol. i. p. 464-5.

It deserves to be noticed, that the introduction of this beneficial plant into modern husbandry, has been attended with numerous and important advantages. Since that period, the new system of stall-feeding dates its origin. Many insignificant farms, on the Continent, have since been converted into valuable estates; for, as this species of clover is annually productive of three or four crops, for two years at least, it is generally ploughed in, after the last mowing, in autumn, and wheat or rye, immediately sown on the land, without any other manure, except what is derived from the fertilizing roots of that vegetable. Sometimes, however, gypsum is scattered on such fields during the winter.

In times of great scarcity, bread has been prepared from the flowers of the common clover. In Sweden, the heads are employed for dyeing wool of a green colour; and if mixed with alum, they yield a light, if with copperas, a dark green colour.

2. The *medium*, or red perennial clover, which is found in pastures, hedges, and on the sides of woods. It thrives on a rich soil, whether clay or gravel, and will even grow upon a moor, if properly cultivated. It grows spontaneously on marl-land; but is usually reared from seed, which should be put in the ground from the middle of April to the middle of May. This species, as well as the common clover, is frequently sown together with flax, on a soil highly cultivated for that purpose; and, as the latter is a forward plant, it is generally removed so early as to allow the clover time for growing. Red clover is sometimes sown by itself; but this practice is by no means to be recommended; for the crop is liable to be lost, unless it be sheltered in its infant state, during the severity of the winter.

When red clover is intended for seed, the ground ought to be carefully cleared of weeds, that the seed may be preserved pure. It is collected both from the first and second crop, but principally from the former. When one half of the field has changed its colour, by the drying of the *clover heads*, the reaping of them may then be commenced. In America, this is effected by two implements, which, for ingenuity and simplicity of construction, deserve to be greatly recommended: we have therefore subjoined the following representations;



Dimensions.

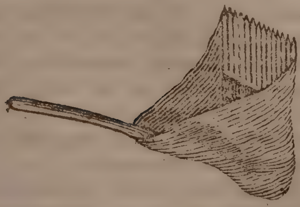
1, 2, The shafts, 4 feet 4 inches long, and three feet asunder.

3, 4, The handles, 3 feet long, and 20 inches apart.

5, The fingers, or teeth, thirteen inches long.

The wheels are sixteen inches in diameter.

This machine is drawn by one horse, and guided by a man or boy; it simply consists of an open box, about 4 feet square at the bottom, and about 3 in height, on three sides; to the fore part, which is open, fingers are fixed, similar to those of a cradle, about 3 feet in length, and so near as to break off the heads from the clover-stocks between them, which are thrown back into the box as the horse advances. The box is fixed on an axle-tree, supported by two small wheels, two feet in diameter; two handles are affixed to the hinder part, by means of which the driver, while he manages the horse, raises or lowers the fingers of the machine, so as to take off all the heads of the grass; and, as often as the box is filled with them, they are thrown out, and the horse goes on as before.



This instrument is called a *cradle*, and is made of an oak board, about 18 inches in length and 10 in breadth. The fore-part of it, to the length of 9 inches, is sawed into fingers; a handle is inserted behind, inclining towards them, and a cloth put round the back part of the board, which is cut somewhat circular, and raised on the handle: this collects the heads or tops of the grass, and prevents them from scattering, as they are struck off by the cradle, which may be made of different sizes; being smaller in proportion for women and children, who, by means of it, may likewise collect large quantities.

As soon as the clover is mown, it should be immediately raked into small heaps, and exposed in the field, to promote the decay of the husk, as otherwise it will be difficult to obtain the seed. These heaps should be occasionally turned, especially during wet weather, It may, however, be easily ascertained, whether the husks are sufficiently rotten, or dry, by rubbing the heads or tops between the hands; when that is effected, they should be housed, and the seed threshed out when convenient, and cleared with a wire riddle. Lastly, this species is a valuable substitute for the common clover, as it continues much longer in the land.

3. The *procumbens* or hop-clover, or hop trefoil, which grows in dry meadows and pastures. It flowers in the months of June and July. When mixed with common clover, on light land, it makes a most excellent fodder. This plant is variously called back-grass and nonsuch.

4. The *repens*, or white-clover, which abounds in meadows and pastures. It also delights in light land, where it will thrive luxuriantly,

antly, if frequently rolled. It is usually sown with red clover, rye-grass, or barley, and is in blossom from May to September. It produces the sweetest hay on dry land, especially when mixed with hop-clover and rye-grass; and possesses this advantage over the common clover, that it will admit of being irrigated. Horses, cows, and goats eat it, but sheep are not fond of it, and hogs totally refuse it.

The great utility of clover in fattening cattle is well known: we shall, therefore, conclude this article with recommending the practice of *tippling*, generally followed in the north of England, for preserving clover in wet seasons. This is effected by rolling up the grass, immediately after it has been mown, into bundles, or *tipples* of the size of a small barley sheaf. A band is then drawn out from one side, which is twisted and tied firmly round: the tipple being placed between the knees, the part above the band is drawn through the hands with a twist, and the longest grasses are pulled out, so as to tie in a knot, which finishes the point of the cone, and forms the tipple. The advantages of this practice are obvious to the most superficial observer, as the rain is carried off in manner similar to the thatch of a house; and the sun and wind thoroughly penetrate it, so as to prevent fermentation.

In Scotland, when clover is made into hay, it is formed into ricks, containing from 40 to 60 stone weight, within two or three days after it is cut; thus it remains for two or three weeks, till it is collected into long stacks, some of which consist of 10,000 stone. Few instances occur of hay preserved in this manner, being damaged by heating; nor is there the least danger of its taking fire.

CLOVE-TREE, or *Caryophyllus aromaticus*, L. a native of the Molucca Islands, particularly of Amboyna, where it is chiefly cultivated. The clove-tree resembles the olive in its bark, and the laurel in its height and leaves: no grass grows under it. Adorned with numerous branches, it produces vast quantities of flowers, which are at first white, then green, and at last red and hard. When they arrive at this degree of maturity, they are, properly speaking, *cloves*: in a dry state, they assume a dark yellowish cast, and at length a deep brown.

Cloves acquire weight by imbibing water, when suspended above it, even at some distance. The Dutch, who were formerly in the sole possession of the clove-trade, are supposed to have frequently taken advantage of that property; but such nefarious practices may be easily detected, by squeezing the cloves with the hand, and expressing their moisture.

This spice possesses a very fragrant, agreeable scent, and a bitterish pungent taste, which, in a manner, burns the mouth and throat. Considered as a medicine, cloves are very hot, stimulating aromatics. When distilled, they yield a limpid essential oil, which is often, though improperly, employed for curing the tooth-ach; as, from its pungent nature, it is apt to corrode the gums, and injure the adjacent teeth.

CLUB-GRASS. See CLUB-RUSH.

CLUB-MOSS, or *Lycopodium*, L. a native genus of plants, comprising six species, the principal of which are—1. The *clavatum*, or common club-moss, which grows in dry mountainous places, heaths, and woods. It is principally found in the north of England; produces a prostrate creeping stem, from one to three yards in length: flowers from July to August, and bears seeds, which, if infused in ropy wine, will, in a few days, restore it. When thrown into a fire, these seeds emit a bright flash, and also possess the peculiar property of being almost impervious to moisture, so that if they are scattered on a bason of water, the hand may be immersed to the bottom, without being wetted.—In the north of Europe they are pulverized, and applied externally for curing chaps in the skin and other sores. Beautiful mats, or summer carpets, are manufactured of the stalks of this plant, in Sweden.

2. The *selago*, or fir-leaved club-moss, which is very common on the mountainous heaths in the Highlands of Scotland, the Hebrides, and in the northern parts of England. This plant rises from two to five inches in height, and is in bloom from April to October. In the island of Raasay, in Ross-shire, and likewise in some other places, the inhabitants employ it as a substitute for alum, to fix the colour in dyeing. The Swedes make a decoction of it, and apply it to hogs and cattle, for the destruction of vermin. The Highlanders also occasionally take an infusion of it, as an emetic and cathartic, but it operates violently; and unless taken in a small dose, causes giddiness and convulsions.

CLUB-RUSH, or *Scirpus*, L. a native genus of plants, consisting of twelve species: the following are the principal:

1. The *palustris*, or marsh creeping club-rush, which thrives on the banks of rivers, ponds, and ditches, and is chiefly found in the western parts of England. It is perennial, grows from six inches to two feet high, and flowers in the month of June or July. Hogs eagerly devour the roots of this species when fresh, but will not touch them when dry. They are also eaten by goats and horses, but refused by cows and sheep.

2. The *lacustris*. See BULL-RUSH.

3. The *maritimus*, or salt-marsh club-rush, which is found on the sea-coast near Yarmouth, and also near Shirley-wych, Stafford. It is perennial, and flowers in the month of July or August. Cows eat this plant; and its tuberous roots, when dried and ground to powder, have, in times of scarcity, been used as a good substitute for flour.

CLYSTERS, or INJECTIONS, or *Lavemens*, are liquid remedies introduced into the larger intestines, by the rectum. The most usual clystering machines are those consisting simply of the bladder of a hog, sheep or ox, to which an ivory pipe is fastened with packthread. A more convenient and durable sort is prepared of *India-rubber*, instead of a bladder; though the French and Germans employ, in preference, a long pewter syringe by which the liquor may, with more ease and expedition, be drawn in, and likewise more forcibly expelled, than from a bladder. Both methods, however, are in many instances liable to great objections, especially the former, which cannot be administered without the assistance of another person, even though the patient should possess sufficient strength and dexterity to perform the operation. Hence we cannot, in justice to

Mr. SAVIGNY, of King-street, Covent-garden, omit to mention his newly invented *machine for lavemens*; which, for simplicity of construction, facility in using it, cleanliness and durability, far surpasses every former contrivance. This machine is ingeniously adapted both for private use, and to admit of assistance. One of its essential advantages is, that the injection may be received into the body, without the least intervention of *air*; because the cylinder containing the liquid is provided with a piston, which, by gently pressing it down upon the fluid, till it appears on the top of the ivory pipe, expels the air, and thus prevents its introduction into the bowels:—the whole apparatus, in a mahogany case, is sold by Mr. SAVIGNY, for one guinea and a half.

Clysters form a very important class of medicines, which, if properly understood and applied, might be effectually substituted for many remedies swallowed by the mouth, to the detriment of the stomach, as well as the whole animal economy. For Nature never intended, that the receptacle of nourishment should become the laboratory of drugs; the local effects of which, sooner or later, cannot fail to impair digestion, and lay the foundation of more serious evils than those deluded patients vainly imagined to remove. We shall not, however, in this place, expatiate upon the impropriety and absurdity of these practices, which more properly belong to the article QUACK-MEDICINES.

Clysters not only serve to evacuate the contents of the belly, in cases of obstinate costiveness, but also to convey into the system medicinal preparations of great activity. Thus opium, the Peruvian bark, &c. when they cannot be taken by the mouth, may be given in much larger doses, and with less danger: nay, the most nutritive and strengthening liquids may, in this manner, be administered to persons unable to swallow, so that their lives may be supported for many months, and even years, by means of clysters alone. In short, it may without hesitation be affirmed, that injections are more conformable to the intricate functions of the animal body, and doubtless safer, than the introduction of medicines by the stomach.

Although clysters should never be administered too *hot*, or too *cold*, yet there are certain complaints accompanied with such debility of the larger intestines, and the abdominal muscles, as renders the application of *cool* liquids sometimes necessary: such cases, however, must be determined by the experienced practitioner. In general, therefore, these remedies are given in a tepid or lukewarm state, that is, from the 80th to the 96th degree of FAHRENHEIT'S scale. The quantity used for adults, is from half a pint to one pint; and for children, according to their age, from two or three spoonfuls to half a pint.

Anodyne Clyster.—Take of either linseed-tea, or new milk, from half a pint to three quarters of a pint, and add from 40 to 60 drops of laudanum.

Laxative Clyster.—Milk and water, six ounces each; sweet oil, or fresh butter, two ounces; and if a stronger dose be required, add one ounce of GLAUBER'S salt, or two table spoonfuls of common salt. In inflammatory or putrid disorders, however, it will be more proper to inject a clyster composed of two-thirds of thin gruel, and one-third of strong vinegar.

For the various forms and ingredients of clysters, to answer different purposes, we refer to the articles, COLIC, COSTIVENESS, DYSENTERY, FLATULENCY, HYSTERICS, URINE, WORMS, &c.

COACHES, are covered vehicles for travelling, suspended on springs, and moved by wheels. Although these articles of convenience and luxury were not unknown to the ancient Romans, yet the first coach appears to have been introduced into England by the Earl of ARUNDEL, who imported it from Germany, about the year 1580.

By the 38 GEO. III. c. 41, all former duties on coaches, &c. are repealed, and the following charged in lieu of them—namely, for every coach, berlin, landau, chariot, calash, with four wheels; chaise-marine, chaise with four wheels, or by whatsoever name such carriages may be called, kept by any person for his own use, or to be lett out for hire (hackney-coaches excepted), shall be paid the yearly sum of 9l. 12s.: and for every such carriage, &c. with four wheels, lett to hire for the purpose of travelling post, by any licensed post-master or inn-keeper, whose name and place of abode shall be painted thereon, the sum of 8l. 8s.: and for every carriage with less than four wheels, kept by any person for his own use, or to be lett out to hire, the sum of 4l. 4s.—*Note.* Carriages with *four wheels,* lett to hire, to travel post for a day, or less period of time, or by the mile, or from stage to stage, are to be charged only 8l. 8s. per carriage.

HACKNEY-COACHES, are those exposed to hire in the streets of London, as well as other large cities, and paid at certain rates, which are fixed by legal authority. The number of hackney-coaches allowed in London and Westminster, is 1000; which are licensed by Commissioners; and their proprietors pay a weekly duty of ten shillings. Numbers, painted on tin plates, are affixed to each coach-door; and their fares, or rates, are settled by parliament: these have been considerably raised by a late act (39 and 40 GEO. III. c. 47), which vests a discretionary power in the Commissioners for licensing hackney-coaches, and of raising their fares, when the price of oats shall exceed a certain sum per quarter.

For every hackney-coach hired, or kept in waiting, between six o'clock in the morning and twelve at night, for any time not exceeding forty minutes, *one shilling*; and for every further period of time, not exceeding twenty minutes, computed from the expiration of the first forty minutes, *sixpence.*

For every hackney-coach hired in any part of the cities of London and Westminster, or the Borough of Southwark, or any place adjoining thereto, where and from whence there is a regular continuation of carriage-way pavement, or at any standing for hackney-coaches beyond such regular continuation, and taken to, and discharged at, such a time as will prevent its return before sun-set to the nearest carriage-way, pavement, or standing (estimating the driving at the rate of five miles within the hour); in such case, *sixpence* per mile, or half fare, is allowed by the act, for such ground as it may have to return

turn before sun-set.—No fraction, or any sum less than sixpence, to be demanded or paid.

For every hackney-coach hired, or kept by the day (not exceeding twelve hours), and before twelve o'clock at night, and not running more than twenty miles, the fare is eighteen shillings for each day.

Every hackney-coach hired, or kept in waiting for any time after twelve o'clock at night, and before six o'clock in the morning, for every distance not exceeding one mile, *one shilling* and *sixpence*; for every distance not exceeding one mile and a half, *two shillings*; and so on, adding *sixpence* to every additional *shilling*.—Ground or time may be taken by the coachman.

Distances not exceeding a mile, are *one-shilling* fares; not exceeding one mile and a half, are *eighteen-penny* fares; and not exceeding two miles, are *two-shilling* fares; between the hours of six o'clock in the morning and twelve o'clock at night.—Every coachman is compellable to go with any person desirous of hiring him, whether his coach is, or is not, on the stand, if he cannot prove that he is hired.

When the average price of oats shall exceed *twenty-five shillings* per quarter, the Commissioners may cause the following addition to the fares: upon every fare of *two shillings*, an additional sixpence; upon every fare of *four shillings*, an additional shilling; and so forth, upon every increase of *two shillings*. But, when the average price of oats is at, or under, *one guinea* per quarter, the following deductions must be made: *sixpence* from all fares between *two shillings* and *five shillings*; between *five shillings* and *seven shillings* and *sixpence*, one shilling; between *seven shillings* and *sixpence* and *ten shillings*, one shilling and sixpence; and from *ten shillings*, upwards, two shillings.

The penalties under the act for regulating hackney-coaches, are recoverable at the Hackney-coach Office, Somerset-place, Strand, where the Commissioners administer the most impartial justice between the hirer and the hired.

STAGE-COACHES, are those appointed for the conveyance of travellers and property, from one city or town to another. The proprietors of these coaches are not liable to actions for the recovery of property lost by the coachman, if he take the carriage on his own account; unless such goods or parcels be properly entered into a book, and an adequate price be paid for them, if exceeding 5l. in value.

MAIL-COACHES, are post-carriages of a peculiar construction, being lighter, more elegant, and not so liable to be overturned as the common stage-coaches. For a certain consideration, they carry His Majesty's mails; are protected by a guard; and subject to the regulations of the post-office. The time of their arrival and departure is fixed; they are restricted to four inside passengers; generally travel seven miles in an hour; and have been found very serviceable to the commerce and correspondence of this country.

COAL, in mineralogy, a solid, inflammable, and bituminous substance, commonly used for fuel: it consists of various species; the principal of which are:

1. The *Lithantrax*, or Pit-coal; a black, solid, compact, but brittle

mass, and moderately hard, which retains its solidity, when heated. Its component parts, according to Mr. KIRWAN, are petrol, or asphaltum, mixed with a small portion of argillaceous earth, and frequently blended with pyrites, or fire-stone. A red tincture is extracted from this species of coal, by means of spirit of wine.

2. *Culm-coal*, which, together with a moderate quantity of petrol, has a larger proportion of argillaceous earth, and vitriolic acid, than the pit-coal, to which it bears a strong resemblance. Its texture is not so bright as that of the former species; and it burns with a flame, without being consumed, leaving a slate nearly of the same size as the original volume of the coal.

3. *Slate-coal*, which contains so large a quantity of argillaceous earth, that it has the appearance of common slate. It, nevertheless, burns by itself, with a flame, and is found principally in the quarries near Purbeck; and in such abundance, that the poorer class of inhabitants in that neighbourhood are wholly supplied with it, for their common fuel.

4. The *Ampelites*, or Canal-coal, is of a dull black colour, and easily breaks in every direction. It burns with a bright flame, but frequently flies to pieces in the fire: it may, however, be divested of this property, by being immersed in water for several hours, previously to its being used. As this coal is of an uniform, hard texture, it is readily turned on a lath, and takes a good polish. Hence, it is used for making various toys, which greatly resemble those manufactured from the finest jet.

5. *Kilkenny-coal* is the lightest of the various species of this fossil. Although containing the largest proportion of asphaltum, it emits less smoke and flame, produces a more intense degree of heat, and is more slowly consumed than the canal-coal. This valuable coal is chiefly found in the county of Kilkenny, in Ireland.

These are the principal varieties of coal most commonly known; but they are not uniformly of the same kind or nature, in the different places where they are found. On the contrary, the various proportions and qualities of their ingredients, produce a great number of other varieties, which are calculated for different purposes, according to the quantity and quality of their contents. Hence it happens, that various kinds of coal are often found intermixed in one stratum, and some of the finer sorts frequently run like veins among the coarser species.

Coals are applied to various purposes, and are eminently useful in the smelting of ores, especially when burnt into *coke* (to which we refer); but, by these processes, considerable quantities of tar and pitch have hitherto been, inattentively, wasted. To obviate these losses, the ingenious Lord DUNDONALD erected ovens of a peculiar construction, for burning pit-coal into coke, and, at the same time, for collecting, in separate vessels, the volatile alkali, pitch, oil, and tar, which would otherwise have been dissipated. For this invention he obtained a patent, on the 30th of April, 1781, for 14 years; which term was afterwards, by an act of parliament, extended to 20 years, to commence from the 1st day of June, 1785. His ovens are so contrived, as to admit the external air to pass through the vessels, or buildings containing the coal, from which any of the abovementioned substances are to be extracted. After being kindled, the coals are decomposed by a slow, but imperfect combustion, without dissipating the ingredients. The residuum in the oven, forms excellent cinders, or coke; while the volatile particles are condensed in reservoirs, placed at proper distances.

It is a circumstance worthy of notice, that not less than 70 kinds of coal are brought to the London market; the value and prices of which differ, in general, from 1s. to 10s. and sometimes even 15s. in the chaldron, according to their qualities. About 45 of these various sorts are imported from Newcastle, and the remainder from Sunderland; the whole of which may be divided into four classes:

The *first* class contains only six kinds of coal; called Wall's-end, Bigg's-main, Walker's, Heaton-main, Willington, and Hebburn-main. The prices of these sorts vary, according to their abundance in the market, from 1s. to 3s. per chaldron; but they are generally upon a par, except the Wall's-end, which is mostly 6d. or 1s. dearer than the others.

The *second* class includes three sorts; all of which *run large.* They light and burn like a candle, and produce white ashes. These are usually mixed either with some of the first class, or with any of the strong sorts of the second, third, and fourth classes; because they run large, and make them burn in a more lively manner. These three sorts are, Hartley, Coupen-main, and Blythe; and their price is generally from 2s. to 4s., more or less, below that of Wall's-end, according to their scarcity or abundance in the market. Next to these are twelve sorts, which possess nearly the same qualities as the best coals, but are in general smaller, and seldom vary more than 2s. in the chaldron, though they are usually from 3s. to 4s. in price under the Wall's-end.

The *third* class consists nearly of the same number as the second, and is likewise divided into two sorts: the first of which burns quickly, and produces white ashes; the other is very strong and good, but, at the same time, very small, and is used by smiths and manufacturers. The prices of this class of coals are generally from 4s. to 6s. per chaldron, more or less, under that of the Wall's-end, according to their abundance or scarcity.

Lastly, the *fourth* class contains all the remaining kinds of coal: they differ also in quality; some burn light, produce white ashes, are slaty, and very indifferent; others are small and strong, but not good enough for smiths. The price of these varies greatly, especially of the lighter kind. It is, in general, from 8s. to 10s. and even 15s. lower than the Wall's-end. These different classes, and particularly some of the inferior sorts, are frequently mixed together, and thus afford an opportunity of changing the prices of coals; this, however, is always to the loss of the consumer, who loses 10s. or more in the *quality*, in the hope of saving 4s. or 6s. in the *price.*

The following is a striking instance of the great variation to be found in the quality of coal: in weighing different kinds of that fossil, there was the surprizing difference of 30lbs. in the weight of two sacks, which were equally filled.

All the coals brought to the London market are publicly sold, only by the whole, half, or quarter ship. Those who have neither craft nor wharfs to unload, at the rate of 40 chaldrons per day, purchase from some of the greatest coal-merchants: this is called *loading on account*; and the former pay 1s. per chaldron for commission.

Pool-measure is one-fourth of a chaldron extra, on any five chaldrons; and a room of coals of 5¼ chaldrons, contains about 68 sacks of three bushels each, or somewhat less; but this quantity may be divided into from 70 to 90 sacks, if they are filled up, and not measured by the bushel, under the inspection of a sworn meter. The pool measure, therefore, being larger than the bushel measure, the profit of a coal-merchant may be estimated, upon an average, at five sacks upon five chaldrons, that is, at about 8 per cent.

Coals constitute one of the chief articles of domestic convenience, especially during the severity of winter. Hence, in that season, they frequently become extremely scarce, and are sold at an extravagant price. To remedy this evil, in some measure, a preparation of clay and coal-dust has been successfully employed; of which we shall communicate the following particulars:

Coal-Balls: Take two-thirds of soft, mellow clay (for instance, a ton), which is free from stones, and work into it three or four bushels of small sea-coal previously sifted; form this composition into balls, or cakes, about three or four inches in diameter, and let them be thoroughly dried. When the fire burns clear, place four or five of these balls in the front of the grate, where they will soon become red, and yield a clear and strong heat, till they are totally consumed. The expence of a ton of this composition is but trifling, when compared with that of a chaldron of coals, as it may be prepared at one-fourth of the cost, and will be of greater service than a chaldron and a half of the latter.

A similar kind of fuel is prepared in the Bishopric of Liege, and is a source of considerable emolument to the inhabitants, who sell great quantities of it annually. A correspondent in the second volume of the "*Museum Rusticum*, &c." mentions this preparation, and adds, that he has seen several fires of it burning in the house at that time occupied by the Royal Society, in Crane-court, Fleet-street. We therefore seriously recommend this article to the attention of those, who, together with the ability, possess the means of alleviating the wants of others.

A patent was granted, in the year 1800, to Mr. Frederic, of Wellbeck-street, for his invention of a fuel, which burns longer than the common coal. As the patentee has published part of the process, in a separate treatise, we shall extract from it the following particulars: The principal ingredient is clay, or where that cannot be procured, cow-dung, road or street mud, saw-dust, turf, horse-dung, straw, and especially tanners' waste; to which may be added, broken glass pulverized, or pitch, tar, oil-cakes, or any other combustible matter, that is not too expensive. These are to be mixed with coal-dust, in circular pits, five or six feet in diameter, and paved at the bottom with bricks. In one of these pits, some clay should be previously softened with water, and well worked with an iron rake; after which operation, any other of the ingredients may be added in the following manner: Two men provided with a pail should first fill one of the pits a foot deep with clay, and throw in the small coal, together with the other ingredients, according to the quantity and proportion required. The whole should then be stirred repeatedly with a large rake, and the pit progressively be filled up, till the clay becomes so thoroughly incorporated with the other substances, and acquires such a degree of consistence, that it can no longer be stirred. More clay should be added; and the same operation repeated till the pit is full; when the mixture should remain in it, till the water is in a great measure evaporated, and the composition becomes fit for use; during which time another pit may be filled in a similar manner.

When the mixture has acquired a sufficient degree of consistence, and is ready to be formed into cakes, a mould made of deal, about four cubic inches square, should be prepared, and previously wetted, to prevent the mass from adhering to it; but, before this composition be put into the mould, Mr. Frederic recommends saw-dust to be spread over it, by means of which the cakes will dry more quickly, and burn much better. The last operation is that of drying, which should be effected in a shed, about seven feet high, and as long as may be necessary. The cakes may also be dried on the ground, in the open air, but as they are liable to be wetted by rain, the labour already bestowed upon them would be useless. A shed, therefore, if it can be procured, is most eligible; and should be divided into upright rows six or seven feet high, about three inches thick, and three feet distant; being intersected every six inches by a cross bar twelve inches in length, for receiving, on both sides, laths of about three quarters of an inch thick; and which should be about two inches and a half apart. On these laths, the cakes are to be laid for drying, which, during the summer, will take place in less than a week.

This invention, we conceive, is of considerable utility, and reflects great credit on the patentee, who has voluntarily consented to relinquish his privilege, and offered to explain his process to any public establishment, or charity, that may be inclined to prepare these cakes, upon a large scale, so as to sell them at a reduced price, and thus furnish the poor with that most necessary article of domestic comfort, fuel.

Use of Coals as manure.—The first experiments for ascertaining the effect of pounded coals, or their ashes, on the fertility of meadows and corn-fields, we believe, were made in Germany, by Counsellor Stumpf, about the year 1791. On account of the vitriolic acid contained in coals, they are, for this purpose, superior to gypsum, especially on cold, calcareous soils. According to his directions, the coal-dust, or powder, ought to be scattered on the fields, late in autumn, about the thickness of the back of an ordinary knife, so that he employed about four cwt. of coal to manure a German acre of 180 square roods, Rhenish measure. But, as there is a great difference between those coals, the residue of which, after burning, consists of *calcareous* earth, or stone, and others, which leave an aluminous slate; he advises the agriculturist to make use of the former kind for every species of clover and grasses, as well as for wheat, rye, barley, oats, or similar grain; and to avail himself of the latter in the culture of spelt, buck-wheat, as likewise of clover, and the different species of grain, but particularly of all the leguminous fruit, such as peas, beans, &c.

Coal-mine, a coal-work, or place from which coals are dug and raised. The maliciously setting coal-mines on fire, is felony without benefit of clergy, by stat. 10 Geo. II. c. 32, sect. 6.

Small-coal, is a kind of charcoal, prepared from the spray, and brushwood, stripped off the branches of coppice-wood, which are sometimes tied up in bundles for that purpose, and sometimes charred, without being tied; which operation is called *coming it together*.

COBALT, a semi-metal of a whitish-grey colour, and nearly resembling fine hardened steel: it is as difficult to be fused as copper, or even gold; and cannot be easily calcined. If the calx, resulting from that process, be melted with borax, pot-ash, or siliceous sand, it affords the blue glass, denominated by artists, *smalt*, which is principally employed in painting enamel, and in tinging other glass, being of all colours the most fixed in the fire. This semi-metal abounds in England, chiefly in the Mendip Hills in Somersetshire, and also in Cornwall, where it has lately been dug up in large quantities, and turned to considerable emolument.

COCCULUS *Indicus*, or Indian Berry, is the poisonous fruit of the *Menispermum*, L. or Moon-seed, an exotic genus of plants, growing in the southern parts of Europe, whence it is imported. It possesses an intoxicating property, and is on that account too frequently mixed with malt liquors, though such nefarious practice is expressly prohibited by act of parliament. The seeds of this plant are made into a paste in the Levant, where it is employed as a specific for cutaneous eruptions.

COCCUS, a genus of insects, comprising twenty-two species, which are principally denominated from the plants they frequent. The most remarkable of these are:

1. The *Coccus hesperidum*, or green-house bug, which chiefly infests orange, and other plants in green-houses. When young, it runs upon the trees, but afterwards settles on some leaf, where it deposits a great number of eggs, and dies.

2. The *Coccus malorum*, or apple-tree Coccus, which, as soon as it fixes on a tree, communicates a corrosive ichor, that affects the bark, even after the insect is removed, in a manner similar to a gangrene; so that it becomes blotched, and full of deep holes, in consequence of which, it decays and dies. This insect preferably attacks the tender buds of young trees, and may be easily removed by means of a hard painter's brush, without injury to the plant, if it has not had sufficient time to bury itself in the bark. It also settles in such cavities as are frequently produced in the stems of trees, by incautiously tearing off the branches, or by any other wound. Being thus protected from the rain, these ver-

min can only be eradicated, by scooping them out, cutting off every irregular prominence, scraping off all loose scales from the bark, and then covering it with Mr. Forsyth's composition, which will not only defend it against their devastations, but, by bringing on a smooth, clean bark, will admit of its being washed and cleaned afterwards, without difficulty. This process will preserve the tree, both from the depredations of these insects, and from those of many others, which shelter themselves in the inequalities of a rough bark, and will at the same time give it additional health and vigour. See vol. i. p. 88.

3. The *Peach Coccus*, which Dr. Anderson calls gall-nut, settles only on the twigs of peach-trees, where it deposits innumerable eggs. These may be eradicated by carefully brushing the twigs, in the spring, with a hard brush, in the direction of the buds; by which simple means many of them may be detached, and their numbers greatly reduced. Where the insects are very close together at the points of the twigs, the latter may be cut off, and carried out of the garden; for, if thrown on the ground, the former will re-ascend. But, if they are exceedingly numerous, all the young trees may even be lopped, especially if Mr. Forsyth's plaster be applied to the wounds. Although, by this operation, the fruit will be lost for that season, yet the tree will acquire considerable strength, and be in the finest order next year. Notwithstanding all these precautions, it will be necessary to examine the tree, with the utmost attention, towards the end of April, or beginning of May; for, at that season, the female vermin attain their full growth, so as to be easily perceptible; when each of them should be carefully detached from the branch to which it adheres, by means of a blunt knife with a very thin blade; then deposited in a vessel, and removed from the garden.

Naturalists have computed, that the generation of 3000 insects will be prevented by the destruction of each female gall-nut, so that great progress may be made in a very short time. Thus, if that necessary operation be performed with care, very few will escape; and if the eggs also be properly extirpated, all future trouble respecting this insect will be effectually obviated.

4. The *Coccus Phalaridis*, which is found on the *phalaris* or canary-grass, and is originally a native of the Canary Islands, but has become naturalized.

5. The *Coccus Cacti*, or cochineal insect, which is a native of the warmer parts of America.—See Cochineal.

6. The *Coccus Ilicis*, or kermes, which inhabits a species of oak, called *quercus coccifera*, and is a native of the southern parts of Europe.—It is used in dyeing a deep red colour.

7. The *Coccus Lacca*, or gum-lac animal, a native of the East Indies.—See Gum-lac.

8. The *Coccus Polonicus*, or scarlet grain of Poland, is found there in great abundance on the roots of the *polygonum cocciferum*. It is also called the *cochineal of the north*; as, contrary to the nature of the American insect, it thrives only in cold climates. It is collected for the use of dyers; though it yields not only smaller crops, and is gathered with more difficulty, but the drug also is much inferior to the true cochineal.

COCHINEAL, a drug used by dyers for imparting red colours, and also for the purpose of making *carmine*. It consists of an insect which is collected from the *cactus cochenillifer*, or, as it is differently called, *nopal*, or *nopalleca*, the Indian fig-tree; and is found most abundantly in the provinces of Oaxaca, Tlascala, and Chiapa, in South America. It is nourished solely by the juice of the plant on which it breeds, and which becomes converted into its substance, yielding a most beautiful scarlet and crimson colour.

The cochineal insects are usually gathered in the beginning of August, when they are killed, either by being immersed in hot water, or put into an oven moderately heated for that purpose; or, more advantageously, by being exposed to the scorching rays of the sun.—The last mentioned method is reputed to be of superior efficacy for preserving the colouring property; and the cochineal thus treated, is of a shining silver grey. More than one million of pounds of this drug are annually imported into Europe; and it pays at present, in this country, only a convoy duty of 10d. per pound: the best sort was lately sold at from 15s. to one guinea the lb.—It is remarkable, that these worms may be kept in a dry state for more than a hundred years, without being in the least affected by the tooth of time.

COCK, or *Gallus*, L. a species of the *phasianus*, too well known to require any description. The cock was first introduced into Europe from Persia, and is eminently distinguished for his courage, especially when opposed to one of his own species. Advantage has been taken of this peculiarity; and, to the disgrace of mankind, the brutal practice of *cock-fighting* has been reduced to a regular system. In some parts of Asia, cock-fighting furnishes amusement to kings and princes; and, though it is evidently on the decline in this country, yet it imperiously demands the attention of an enlightened legislature, to eradicate totally this inhuman custom.

COCK-CHAFER. See CHAFER.

COCKLE. See CORN-COCKLE.

COCKLE, or *Cardium*, L. a genus of small shell-fish, consisting of twenty-one species. They are commonly found on sandy coasts, and furnish a wholesome and agreeable food. When consumed in a raw state, cockles are supposed to produce poisonous effects: and, though we have no positive proofs in confirmation of this conjecture, it will be more prudent to boil and eat them with the addition of a little pepper and vinegar, or at least the latter, which at the same time promotes their digestion.

COCKROACH, or *Blatta*, L. a genus of insects, resembling the beetle, and consisting of ten species, the most remarkable of which is the *orientalis*, or eastern cockroach. These insects are frequently found in America; they penetrate chests, drawers, &c. and do considerable injury to clothes. They seldom appear till night, when they infest beds, and bite very severely, leaving an unpleasant smell. Their food is bread, meat, whether raw or dressed, linen, books, silk-worms, and their cods, &c.—According to Sir HANS SLOANE, the Indians mix the ashes of the cockroach with sugar, and apply them to ulcers, in order to promote their suppuration.

COCK's-FOOT, or Cock's-foot Grass, or *Dactylis*, L. a genus of plants comprising seven species; of which two are indigenous:—1. The *Stricta*, or Smooth Cock's-foot Grass, which grows in marshes, and on the sea-coast. It is principally found in the eastern and southern parts of England, is perennial, and flowers in the month of August. 2. The *Glomerata*, or Rough Cock's-foot Grass, which thrives in pastures and in shady places, under the drippings of trees. This plant is also perennial, is in flower from June to August, and grows to the height of four or five feet, when seeding. It is somewhat coarse, but very luxuriant, especially in the leaves, which are often two feet long: they are eaten by horses, sheep, and goats, but particularly by cows, which are extremely fond of them, when growing on a rich soil. Dogs and cats instinctively search for and swallow this herb, when they incline to vomit, or to envelope the splinters of bones collected in their stomach.

Cocks-Head. See Common Saintfoin.

COCOA, or *Cocos*, L. a native tree of the East and West Indies, where it is of the greatest use to the inhabitants. It frequently grows to the height of 60 or 70 feet in the trunk, and delights in a moist sandy soil, especially near banks of rivers and the sea-coast, where it is propagated by planting its ripe and fresh nuts, that generally come up in the course of six weeks or two months. From these delicious nuts is prepared the well-known beverage called Chocolate, to which we refer.—Each branch produces from ten to twenty nuts, which, when half ripe, contain a sweet milky liquor, well calculated to quench thirst, and of great service in many diseases of a putrid and inflammatory tendency. If the nuts are allowed to become ripe on the tree, this liquor hardens into a kernel, which is partly eaten raw, and partly expressed and converted into an oil, that forms an important branch of trade in the Indies. Of the sap, obtained by incision from the *spatha*, or flower-sheath, the natives prepare wine, vinegar, arrack, and sugar.

The leaves of the cocoa-tree are upwards of ten feet long, and thirty inches broad. It presents a constant succession of blossoms and fruit, nearly throughout the year; its trunk serves for timber and cabinet-ware; from the leaves are manufactured, baskets, hats, sail-cloth, mats, parasols, shingles for covering houses, paper, &c.

COD, the Common, or *Gadus Morhua*, L. an inhabitant of the ocean, which is from two to four feet long, and weighs from 12 to 20lbs.: it is found only in the northern parts of the world, between the latitudes of 66 and 50 degrees. The principal fishery for cod, is on the banks of Newfoundland, where they are caught in numbers sufficient to furnish employ for nearly 15,000 British seamen, and to afford subsistence to a still more numerous body of people at home, who are engaged in the various manufactures, which so extensive a fishery demands.

The food of the cod consists of small fish, worms, crabs, &c.: their digestion is so vigorous, as to dissolve the greatest part of the shells they swallow. Hence they are extremely voracious, and catch at any small object they perceive agitated by the water, even stones and pebbles, which are frequently found in their stomachs. Of the salted roe of this fish, not less than fifteen ship-loads are said to be annually exported from Norway to France; whose fishermen employ that substance for the taking of anchovies in the Mediterranean. From the liver of cod, a very good train-oil is obtained; and the tongues, when salted, are esteemed a great delicacy, and therefore often imported from Newfoundland. Isinglass is also prepared from their air-bladders, by the fishermen of Iceland; a process which peculiarly merits the attention of the inhabitants of the north of Scotland, where these fish are caught in great abundance. —See Isinglass.

Codded Mouse-Ear. See Common Wall-Cress.

Codlings and Cream. See Willow-Herb, the Great Hairy, or Large-flowered.

COFFEE-TREE, or *Coffea*, L. a shrub from twelve to eighteen feet high, and originally a native of Arabia, but is now cultivated in Persia, the East and West Indies, and several parts of America: it is also reared in the botanic gardens of Europe. Its evergreen foliage resembles that of the laurel; and at the base of the leaves appear, twice annually, white fragrant flowers, which are succeeded by a fruit resembling cherries, but of an unpleasant sweetish taste, each containing two kernels, or berries. They grow in clusters; and, when of a deep red colour, are gathered, and carried to a mill, in order to be manufactured into *coffee-beans*.

There are three principal sorts of this drug known in commerce: 1. The Arabian, or Mokha coffee, imported from the Levant; and which, on account of its superior flavour, is the most esteemed; 2. The East Indian; and, 3. The West Indian coffee of the French, English, and Dutch settlements: among the latter sorts, that of Martinico is generally preferred. Beside the importation and convoy-duties, there is an excise laid on all the coffee consumed in this country, of 1s. 1d. per pound, if imported from the British colonies in America; and 2s. 2½d. if the produce of any other places.

Coffee frequently contracts an unpleasant flavour, when stowed in ships with rum, pepper, or any other article possessing a peculiar smell; a circumstance to which the inferiority of our Jamaica and East Indian coffee may, in a great measure, be attributed. To obviate such damage, the berries ought to be well dried in the sun, before they are shipped in separate vessels, or properly secured, if they are imported together with other merchandize. But, when they have once acquired a disagreeable flavour, it will be necessary to pour boiling water over them, and afterwards to dry them completely in the open air, previously to their being roasted. The colour of a watery infusion, may also serve as a tolerable test for ascertaining the quality of coffee; for if cold water, after standing for several hours over the raw berries, acquire a deep citron colour, we may conclude that the coffee has not been damaged, or adulterated.

Since the introduction of coffee into Europe, in the 16th century, various substitutes have been devised for this drug; such as acorns (which see), beet, succory-root, scorzonera, &c. Among the different species of the beet-root, the *beta cicla v. albissima*, or the root of scarcity, has been preferably recommended for this purpose; and, after having previously extracted the saccharine particles, it ought to be carefully dried and roasted over a moderate fire. It seems, however, doubtful whether the expence and labour necessarily attendant on such preparations, may be adequate to the advantage thus obtained: hence we are of opinion, that the most effectual method of rendering coffee *cheaper*, and preventing its importation, at least for *home consumption*, would be that of rearing this *hardy* shrub in our own climate. To encourage those who are desirous of making this patriotic experiment, we shall communicate the following particulars; on the authenticity of which the reader may fully depend:—A nobleman in Germany found, in a bag of raw coffee, twenty green berries, resembling oblong cherries, and each of which contained two beans. In March 1788, he planted them in a common garden-bed, two inches deep. In April it snowed, and was so cold, that the windows were covered with ice, for two days. Notwithstanding this unfavourable prospect, five of the berries appeared above ground in the latter part of June, and all the others previous to the middle of July. They grew rapidly, being in a shady situation, and a soil somewhat sandy, but well manured. In September, of the same year, they had attained a height of about six inches, and dropped their small leaves about Michaelmas. During the winter, he covered them with a little hay, and afterwards with snow; both of which were removed in the fine weather of April. In this simple manner, they were defended against the severity of German winters; and in the fifth year, four of the little trees produced together seventy-six berries. By the inattention of the gardener, two of the plants died in the very hard frosts of 1798; yet the remaining eighteen were all in blossom the ensuing spring, and yielded, in autumn, three pounds and a half of coffee-berries; the flavour of which was not inferior to that imported from the island of Martinico.

With respect to the medicinal properties of coffee, it is in general excitant and stimulating, though we doubt whether it relaxes the animal fibres, as has by some authors been supposed. Its more or less wholesome effect greatly depends on the climate, as well as the age, constitution, and other peculiarities of the individual. Hence it cannot be recommended to children, or persons of a hot, choleric, nervous, or pthisical habit; nor will it be so safe and useful in warm as in cold and temperate climates; but to the phlegmatic and sedentary, a cup of coffee, one or two hours after a meal, or, which is still better, one hour before it, may be of service to promote digestion, and prevent or remove a propensity to sleep. In cases of spasmodic asthma, hypochondriasis, scrophula, diarrhœa, agues, and particularly against narcotic poisons, such as opium, hemlock, &c. coffee often produces the best effects: nor is there a *domestic* remedy, better adapted to relieve periodical headachs which proceed from want of tone, or from debility of the stomach.

COFFIN, a chest in which dead bodies are interred.

In ancient times, the burying of deceased persons in coffins, was considered as a mark of the highest distinction. But, in Britain, the poorer classes of people are thus interred; and, if the relations of the deceased cannot afford a coffin, it is furnished at the expence of the parish. According to THEVENOT, however, the Eastern nations, whether Turks or Christians, make use of no coffins.

As there appears to prevail a most iniquitous practice, of which no feeling mind can approve, that of robbing graves of corpses, for the purpose of anatomical dissection, we shall present our readers with a short description of the patent granted in July, 1796, to Mr. GABRIEL AUGHTIE, of Cheapside, London, for his improvement in coffins, to prevent the stealing of bodies from them, after interment: this patent has since been assigned to Messrs. JARVIS and Son, undertakers, &c. Charing-cross, and Great Mary-le-bone-street.

The coffin may be made of any kind of wood, and bound with steel, iron, or other metal. The sides are to be curved without saw-curfs; and on the top edge of each side are to be three or more boxes, of iron, steel, or other metal, let in on the inside of the coffin, to receive the springs fixed to the lid; one box to contain a spring on the top edge of the head, and another on the foot, for the same purpose. The screws for fastening down the lid, pass through an iron or metal plate, with a socket, to receive the head, and to prevent its being drawn out by any kind of instrument. These screws are to be placed between each of the springs, in proportion to the number of the latter, and the size of the coffin. The lid is also to be bound with steel, iron, or any other kind of metal, to prevent it from being cut or broke open; and the screws used for fastening it, are to be sunk about half the thickness of the lid. Such screws are not to be notched on the head, but some of them divided with two, and others with four bevils; so that when they are once fixed, it will be impossible to unscrew them; as, by turning the reverse way, there is no hold for any tool to withdraw them.

Many of our readers will, probably, remember that the late Emperor of Germany, JOSEPH II. about the year 1781, enacted a law, by which the interment of dead bodies in coffins was prohibited; nay, it was ordered that they should be buried in bags, and covered with quick-lime, in order to promote their putrefaction, and prevent the exhalation of noxious vapours. This severe regulation, however, met with so universal and decided an opposition, that the enlightened monarch, from prudential motives, was speedily induced to repeal it.

Although we are no advocates for arbitrary measures, by which the feelings of humanity may be wounded, yet on the other hand, we are firmly persuaded that the custom of interring numerous bodies, in the churches and church-yards of populous towns, is attended with effects highly injurious to the living. (See vol. i. p. 392.) And as persuasion and reasoning, when opposed to inveterate prejudices, are not likely to produce a favourable effect on intellects but little improved by education, we venture to suggest a remedy, than which none can be more reasonable, and less oppressive: 1. That, though *all* deceased bodies are to be considered as inviolable, yet the privilege of being deposited in a *coffin* (whether kept above or under ground); *in towns* shall be conferred only on those who have rendered themselves worthy of such a distinction, by virtuous and patriotic actions; and, 2. That all others, including children and adults, shall either be buried at a certain distance from inhabited places, or at least twenty feet deep, if their relations are anxious to see them interred in towns or villages.—See BURIAL, and BURYING-GROUND.

COIN, a piece of metal converted into money, by the impression of certain marks or figures.

Coin differs from money, as the species from the genus. The latter may consist of any substance, whether metal, wood, leather, glass, horn, paper, fruits, shells; in short, whatever is current as a medium in commerce. The former is a particular specie, always made of metal, and struck according to a certain process, called coining.

The first money in commerce was, doubtless, barter, that is, the exchanging of one commodity for another of equal value; and from the difficulty necessarily attendant on the cutting or dividing of certain commodities, men were first induced to invent a substitute for them, that should serve as a general medium. Such is the origin of coin, which varies in different countries, according to the relative value of the different metals of which specie is composed.

The gold coins current in this country are guineas, half-guineas, and seven-shilling pieces; those of silver are, crowns, half-crowns, shillings, and sixpences: to these must be added two-penny pieces, pennies, halfpence, and farthings, which are of copper.

Severe punishments are inflicted on those who are guilty of counterfeiting, debasing, or even clipping the current coin of the realm: for the particulars of which, we refer the reader to "*Blackstone's Commentaries*."

A method of taking off casts from coins:—On account of the great value of antique coins, and the difficulty with which they are obtained, few persons have it in their power to procure a complete series. We, therefore, communicate the following mode, by which that desirable object may be attained, and the industrious antiquary enabled to ascertain many disputed points in history.

The method of taking off impressions, by means of plaster of Paris and sulphur, is well known; but, as the former is too soft, and the latter too brittle, they can be preserved only for a short period. This difficulty may be obviated by laying a coat of the finest tin-foil over the medal intended to be taken off, and rubbing it gently with a brush, till it has received a perfect impression, when the edge of it should be pared, so as to render it of the same circumference. The medal should then be reversed, when the tin-foil will fall into a mould ready to receive it, the concave side being uppermost. Plaster of Paris may be poured upon this, in the usual manner; and, when dry, the cast figure should be taken out, with the tin-foil adhering to it; the convex side being uppermost. In this position, it should be kept in the cabinet; and, if it receive no external injury, will endure for ages.

COKE, is fossil-coal charred, or or having undergone a process similar to that by which charcoal is made. By this operation, coals are divested of their humidity, their acid liquor, and part of their fluid oil. They are principally used, where it is necessary to excite intense heat, as for the smelting of iron ore, and for processes in which the acid and oily particles would be detrimental, as in the drying of malt.

Coke-oven is a kind of furnace, of a circular structure, erected for the purpose of converting coal into coke. Such ovens may, however, at the same time be applied to other purposes. On this account, a patent was granted to the Right Hon. Henry Seymour Conway, in June 1789, for his method of adapting, or conveying the heat arising from the fire of coal, employed in coke-ovens, for working steam-engines, baking bread, &c. calcining and fusing ores and metals, also for warming rooms, &c. heating water for baths, and for many other useful purposes, by which means the expence of the coal or other fuel is entirely, or in the greatest part, saved.

The leading principle of this patent appears to be the constructing of flues both beneath and on the sides of the oven; in which registers are inserted. By means of these, the heat is conveyed to the steam-engines, baking-ovens, &c. which are built upon and against the sides of the coke-ovens, and may be increased or diminished at pleasure, by opening or shutting the registers; the same fire serving both to burn the coke, and to communicate the requisite degree of heat.

COLD, in natural philosophy, is the privation, or absence of heat. Its immediate effects on the human body are, contraction of the cutaneous pores, and a temporary obstruction of insensible perspiration. Hence we perceive what is vulgarly called the "goose skin," and the parts thus affected will not recover their usual elasticity, till the spasm be removed, either by external or internal heat, or by friction, which excites the latter. At present, we shall only treat of the consequences resulting from an *excess of cold*; having already considered part of this subject under the article Catarrh.

Beneficent Nature has enabled our frail and complicated frame, to support the heat and cold of different climates, with equal facility; and though man has devised artificial means of defending his body against the action of cold, or more properly, of retaining the *inbred*, or vital heat, yet it often happens that, by exposure to extreme cold, the fingers, ears, toes, &c. are *frozen*: thus, the natural heat of those parts is reduced to the lowest point consistent with life. If, in such cases, artificial heat be too suddenly applied, a mortification will ensue, and the *frost-bitten* parts spontaneously separate. Hence they ought to be thawed, either by rubbing them with snow, or immersing them in cold water, and afterwards applying warmth in the most careful and gradual manner; by which they will soon be restored to their usual tone and activity. Indeed (a popular writer justly observes), the great secret, or art, of restoring suspended animation, consists in nicely adjusting the natural and artificial stimuli to the exact tone of the irritable fibre.

As moderate cold produces at first debilitating, and eventually bracing effects on the animal body, it is the most beneficial temperature in the cure of febrile, and such diseases as are not attended with extreme debility; but it should never be followed by any considerable degree of heat. SYDENHAM, more than a century ago, pointed out the evils attendant on too much heat in sick-rooms; he seldom would allow his patients even to lie in bed, and very judiciously directed the rooms to be constantly ventilated with cool air. The great benefit derived from this practice in the small-pox, is now generally acknowledged, and arises chiefly from avoiding the stimulus of heat, after its operation.

The great cold produced by *evaporation*, observes Dr. DARWIN, is now well understood. In all chemical processes, where aerial or fluid bodies become consolidated, part of the *latent heat* is pressed out, as in the instant when water freezes, or unites with quicklime. On the contrary, when solid bodies become fluid, or fluid ones become aerial, heat is absorbed by the solution: whence it may be said, in general, that all chemical combinations produce heat, and all chemical solutions generate cold. This should teach the careful gardener, not to water tender vegetables in the heat of sun-shine, or in a warm dry wind, lest the hasty evaporation should produce so much cold as to destroy them; an effect that will the more certainly follow, as they have been previously too much stimulated by heat, in consequence of which, the power of life, or irritability, had been already diminished.

When treating on the diseases of plants, Dr. DARWIN remarks, that though excessive heat is seldom very injurious to vegetation in this country, yet the defect of that element, or in common language, excess of cold, is frequently destructive to the tender shoots of the ash, and the early blossoms of many fruit-trees, such as apples, pears, apricots, &c.—The *blights* occasioned by frost, generally happen in the spring, when warm sunny days are succeeded by cold nights, as the living power of the plant has then been previously exhausted by the stimulus of heat, and is therefore less capable of being excited into the actions necessary to vegetable life, by the greatly diminished stimulus of a freezing atmosphere.

In the northern climates of Sweden and Russia, where long sunny days succeed the melting of copious snows, the gardeners are obliged to shelter their wall-trees from the meridian sun, in the vernal months; an useful precaution, which preserves them from the violent effects of cold in the succeeding night; and, by preventing them from flowering too early, avoids the danger of the vernal frosts. In a similar manner, the destruction of the more succulent parts of vegetables, such as their early shoots, especially when exposed to frosty nights, can only be counteracted by covering them from the descending dews, or rime, by the coping stones of a wall, or mats of straw.

Having given a short account of the sensible effect of a cold temperature on animal and vegetable life, we shall conclude with a few remarks connected with the *natural history* of this elementary power.—The properties of *cold* seem to be directly opposite to those of *heat*: the latter increases the bulk of all bodies; the former contracts them; and, while fire tends to dissipate their substance, cold condenses them, and strengthens their mutual cohesion. But, though cold thus appears, by some of its effects, to be nothing more than the absence or privation of heat, as darkness is only the defect of light, yet cold is probably possessed of another quality, which has induced many to consider it as a substance of a peculiar nature. It is well known, that when a continuance of cold has contracted and condensed bodies to a certain degree, if then its power be increased, instead of progressively lessening their bulk, it enlarges and expands them, so that extreme cold, like heat, swells the substance into which it enters. Thus fluids sensibly contract in a cold temperature, till the moment they begin to freeze, when they immediately dilate, and occupy more space than they possessed while in a state of fluidity. Hence, liquor frozen to ice in a close cask, is often known to burst the vessel: when ice is broke on a pond, it swims upon the surface; a certain proof of its being lighter, or of a larger bulk, than an equal quantity of water. This dilatation of fluids, however, is probably owing to a cause very different from that of excessive cold alone; because the power of freezing may be artificially increased, while the intenseness of the cold receives no considerable addition; and, on the contrary, a substance capable of melting ice, will increase the degree of its coldness. Thus, for instance, sal ammoniac mixed with pounded ice, or with snow, melts either of them into water; and increases their cold to a surprizing degree, as is obvious from the effects of this mixture, in sinking the thermometer. Hence the freezing of fluids cannot be entirely considered as the result of cold, but of some unknown property either in the air or water, which thus mixes with the body, and for a time destroys its fluidity. We cannot, in this place, enter into farther particulars relative to this curious subject; but as there have lately been invented several methods of converting water into ice, which may be of service in domestic economy, we shall communicate the most easy and least expensive processes of this kind, under the article ICE.

COLIC, a disease attended with wandering pain in the bowels, and rumbling noise; both abating on the expulsion of wind: there is a slight degree of thirst; the pulse is scarcely affected, and the pain is not increased by pressure, as is the case in inflammations.

This complaint may arise from a great variety of causes; the principal of which are, 1. Flatulency; 2. Tough, pituitous humours, clogging the intestines; 3. Worms; 4. Bile; 5. The Piles; 6. Hysterics; 7. Acrid food or drink; 8. The inhalation of vapours arising from the decomposition of lead; 9. Rheumatism; 10. The use of sour wines and cyder; 11. The gout; 12. A sudden catarrh; 13. An acid generated in the first passages; 14. Obstructions in the intestinal canal; and, 15. Poisonous substances introduced into the stomach.

Consistently with our plan, we shall but briefly treat, here, of those colics which originate from the 2d, 7th, 10th, and 13th of the causes before enumerated; as the reader will find the other species discussed under their respective heads of the alphabet,

alphabet; and the last, or 15th, under the articles ANTIDOTES and ARSENIC, in our first volume.

If the colic proceed from the *second* cause, it is attended with frequent evacuations of viscid and glossy humours, which produce only occasional relief from pain. Camphor and rhubarb ought to be taken in small doses, namely, one grain of the former, and two grains of the latter, every three hours, or oftener; and after the spasms have subsided, an infusion of *catechu* (which see) or solutions of *alum*, will be found the most effectual remedies.

When acrid food, or tart and corrupt beverage, has occasioned the complaint, it will first be necessary to take a gentle emetic, or if some time has elapsed, to open the bowels by the mildest laxatives, such as castor-oil, a solution of manna, with a few grains of rhubarb, &c.

Colics arising from the use of sour wines and cyder, are generally attended with excruciating pain, and paralytic symptoms. The most proper remedies in such cases are, the tepid bath; emollient fomentations made of chamomile flowers, with the addition of laudanum, applied to the abdomen; all such remedies as promote perspiration, and especially the volatile tincture of guaiacum. But the safest, and perhaps most effectual means of procuring relief from pain, are *antispasmodic clysters:* they should be prepared of a weak decoction of ipecacuanha; for instance, one dram boiled in three-quarters of a pint of water, till the third part be evaporated, adding to every clyster from 30 to 40 drops of laudanum; and repeating the injection every six or eight hours, at a temperature of about 90°.

A similar treatment may be adopted in those colics, which frequently attack persons who have a peculiar tendency to generate an acid in their stomach and bowels: but as this acidity is generally the consequence of obstipations, or obstructions of the abdomen, these ought to be previously removed by the use of *laxative* CLYSTERS (which see), assisted by gentle aperients taken by the mouth, for instance, calcined magnesia and rhubarb, in doses of one scruple of the former, and three grains of the latter, repeated every four or six hours.

Lastly, we think it our duty to caution the reader against the use of heating, stimulating, or spirituous remedies, in every kind of colic, except that arising *solely* from flatulency, without any other predisposing cause: as, however, no ordinary observer will be able to ascertain whether the expulsion of wind, which generally accompanies this complaint, be its generating cause, or only a concomitant symptom, we seriously recommend, in such a state of uncertainty, to abstain from all violent remedies; to apply no other but emollient clysters and fomentations; and to drink large portions of lilac-flower or chamomile tea, or take any other diluent beverage, till the spasms be relieved, and the nature of the disease more clearly understood. These remedies are not fraught with danger; and, if properly persisted in, have frequently been attended with the most desirable effects.—For treating the colic of infants, see BILE, vol. i. p. 257.

COLOPHONY, a black resin, or turpentine, boiled in water, and afterwards dried. It is chiefly used in the composition of horse-medicines.

Coloquintida. See Cucumber.

COLOUR is one of the most remarkable phenomena in nature, the explanation of which, by the ancient philosophers, was vague and unsatisfactory, till Sir Isaac Newton, in 1666, discovered that the coloured image of the sun, formed by a glass prism, was not of a circular, but of an oblong form, contrary to the laws of refraction. Hence he conjectured, that light is not *homogeneal*, or a simple body, but that it consists of rays, some of which are much more refrangible than others. This theory was very generally received, and subsequently improved upon by Dr. Hooke; as well as by other native and foreign philosophers; and, though the doctrine of colours is far from being determined with sufficient precision, yet we are warranted to admit the truth of the following propositions:

1. All the colours in nature proceed from the rays of light.

2. There are seven primary colours; namely, red, orange, yellow, green, blue, purple, and violet or indigo.

3. Every ray of light may be separated into the seven primary colours.

4. The rays of light in passing through the same medium, have different degrees of refrangibility.

5. The variation in the colours of light arises from its different refrangibility; that which is the least refrangible producing red; and that which is the most refrangible, violet.

6. By compounding any two of the primary colours, as red and yellow, or yellow and blue, the intermediate colour, as orange or green, may be produced.

7. The colours of bodies arise from their dispositions to reflect one sort of rays, and to absorb the other.

8. Such bodies as reflect two or more sorts of rays, appear of various colours.

9. The whiteness of bodies arises from their disposition to reflect all the rays of light promiscuously.

10. The blackness of bodies proceeds from their incapacity to reflect any of the rays of light. Hence it is, that a black body, when exposed to the sun, becomes heated much sooner than any other.

Although, of all sensible qualities, colour is the least useful in ascertaining the virtues and powers of vegetables; yet, as the following general positions have been laid down on this subject, by Linnæus, and as they appear to be sufficiently attested by experience, we shall conclude this article with specifying them.—A *yellow* colour generally indicates a bitter taste, as in gentian, aloe, celandine, turmeric, and other yellow flowers. *Red* denotes an acid or sour taste; as in cranberries, barberries, currants, raspberries, mulberries, cherries, the fruit of the rose, sea-buckthorn, and service-tree. Herbs that turn red towards autumn, have also an acid taste; as sorrel, wood-sorrel, and bloody dock. *Green* indicates a crude, alkaline taste, as in leaves and unripe fruits. A *pale* colour denotes an insipid flavour, as in endive, asparagus, and lettuce. *White*, promises to be sweet and luscious to the palate; as in white currants, and plums, sweet-apples, &c. Lastly, *black* indicates a harsh, nauseous, and disagreeable taste; as in the berries of deadly night-shade, myrtle-leaved sumach, herb-christopher, and others; many of which are not only unpleasant to the taste, but pernicious and fatal in their effects.

COLOUR-MAKING, is the art of preparing various colours employed in painting. This art, tho' one of the most curious branches of chemistry, is the least understood. The principles that govern it, differ totally from those, on which the theory of other parts of chemistry is founded; and as the practical part is in the hands of persons who sedulously conceal their methods of preparing colours, we have only a superficial theory, and are but imperfectly acquainted with the practice.

Colours are divided into various classes, such as opaque and transparent; oil and water-colours; simple and compound; true and false.

I. *Opaque colours* are those which, when laid on any substance, efface every other painting or stain; such as white and red-lead, vermillion, &c. *Transparent* colours possess the peculiar property of leaving the ground, on which they are laid, visible through them. These are employed for illuminating maps, charts, &c.

II. *Oil* and *water-colours* are thus denominated, from their being appropriated to painting in oil, and in water.

In preparing oil-colours, care must be taken to grind them extremely fine; and, when they are put on the pallet, to mix those which will not dry of themselves, with drying oils; and also to mix the tinged colours in as small quantities as possible. With respect to the application of them, if employed for large pieces, they should be laid on full, in order that they may incorporate, and more firmly adhere. If they are intended to be *glazed*, particular care must be taken to paint the under-colour strong and smooth; after which the others may be gradually added, till the whole is properly filled up. Oil-colours are, however, sometimes worked dry, where only one is used, as in *cameos*, in which the gradations of colours of distant objects are usually managed by lights, as with crayons; and in *basso relievos*, which are imitations of sculpture, of every kind and colour.

Water-colours are wrought in various modes; namely, in *distemper* (as artists express it), where the colours are prepared in size; in *fresco* or painting on fresh mortar, in which case it is requisite that the *colouring* be quick, lest the stucco or mortar dry, before it can be laid on; and that it be neatly and carefully executed; each colour being properly placed, and occasionally intermingled by parcels; in *agouache*, where the colours are mixed with gum, and the pencil drawn along, as in paint and washings; and lastly, in *miniature*, for small and delicate works, in which the colours are required to be very fine and clean, to be mixed with gum, and worked in dots or points.

III. *Simple and compound colours*. The former are perfect in themselves, such as red and white lead, vermillion, the calces of iron, &c.; the latter are formed by the union of two or more colouring substances; for instance, blue and yellow, when blended together, make a green; red and yellow, an orange; and white earth and cochineal, a lake, &c.

IV. The last and most important division of colours, is into *true* and *false*: the former retain their pristine tinge, without fading, under every possible variety of circumstances; the latter either lose their colour entirely, or change into some other shade.

Colours are chiefly affected by being exposed to the sun during the summer, and to the cold air in winter. White lead, however, forms an exception; as, when ground with oil, it retains its whiteness, if it be exposed to the weather, but degenerates into a brownish or yellowish cast, in a confined situation. Nevertheless, when it is immersed in water, it is totally divested of its colour, whether it be exposed to the effects of the air or not. In the making of colours, the chief object is, that they may not fade, from the influence of the weather; though it must be regretted that the most beautiful are, in general, the least permanent. It may, however, for the most part be assumed, that the more simple any colour is, the less liable it will be to change by exposure to the air.

Having thus briefly stated the general theory of colours, we shall also give some account of the different pigments, which are most commonly employed by colour-makers.

1. Black, consists of several sorts, such as lamp-black, ivory-black, blue-black, and Indian ink. The first of these is the finest of what are called soot-blacks, and is more used than any other. Its preparation depends on the manufacture of common resin. The impure juice collected from incisions made in pine, and fir-trees, is boiled down with a small quantity of water, and strained, while hot, through a bag; the dregs and pieces of bark remaining in the strainer, are burnt in a low oven, whence the smoke is conveyed through a long passage into a square chamber, at the top of which is an opening, with a large sack affixed, made of thin woollen stuff: the soot, or lamp-black, concretes partly in the chamber, whence it is swept out once in two or three days, and partly in the sack, which is occasionally agitated, in order to take down the soot, and to clear the interstices between the threads, so as to admit a free current of air. This method of preparing lamp-black, was originally invented in Sweden, but has also been introduced into this country; and is now carried on to a considerable extent in the turpentine-houses, from the refuse of resinous matters.

Ivory-black is prepared from ivory, or bones, burnt in a close vessel; and, when finely ground, affords a deeper and more beautiful colour than lamp-black; but it is, in general, so much adulterated with charcoal, and so grossly levigated, as to be unfit for use. An opaque deep black, for water-colours, may be prepared, by grinding ivory-black with gum water, or with the aqueous liquid that settles from the whites of eggs, which have stood some time to subside.

German Black, see *Frankfort Blacking*, vol. i. p. 277.

Blue-black is said to be prepared from the burnt stalks and tendrils of vines. This is, however, seldom done by colour-makers, who generally substitute a mixture of ivory-black, and the common blue used for dyeing cloths.

Indian-ink is an excellent black for water-colours, and consists of an equal mixture of lamp-black and common glue. Ivory-black, or charcoal, may be substituted for lamp-black; but it is seldom employed, on account of the great trouble of levigating it to a sufficient degree of fineness.

2. White, of which there are several kinds; as flake-white, white-lead, calcined hartshorn, pearl-white, Spanish-white, egg-shell-white, and magistery of bismuth.

Flake-white, and *white-lead*, are the produce of the same metal. The preparation of the former is kept secret by colour-makers; but the latter is made, by forming thin plates of lead into rolls, and placing them so as to imbibe the fumes of vinegar contained in a vessel, over a moderate fire. Nearly the whole is thus converted into a white calx, which is collected, ground up with water, and formed into little cakes. (See White-Lead.)—These two are the only whites that can be used in oil; all the rest being transparent, unless laid on with water.

Calcined hartshorn is the most useful of the earthy whites, as it contains the least proportion of alkali.

Spanish white is only chalk, very finely prepared.

Pearl-white is made from oyster-shells, as *egg-shell-white* also is from those of eggs. All these, from their attraction for acids, necessarily destroy those colours which are compounded with any acid or metallic salt.

The *magistery of bismuth* is apt to turn back, as well as flake-white, and white lead, when employed for a water-colour.

3. Red. The principal red colours used in painting, are carmine, rose-pink, vermillion, and red-lead.

Carmine is the brightest and most beautiful red colour known at present.—(See vol. i. p. 436).

Rose-pink is a very delicate colour, inclining more to purple than scarlet. It is prepared from chalk, coloured with a decoction of brasil-wood, heightened by an alkaline salt, which renders it very liable to fade, and of little value. This colour might be made more durable, by employing for its basis the white precipitate of lead; and by brightening it with a solution of tin.

Vermillion consists of sulphur and quicksilver, the former of which is melted, when the quicksilver is stirred in, and the whole is converted into a black mass.—See Cinnabar, vol. i. p. 527.

Red-lead is a calx, of a lively yellowish colour, which it acquires by slow calcination. Both these colours are very durable; the former, however, is the best red for oil-painting, but does not answer with water; the latter inclines to an orange; and, like other preparations of lead, frequently turns black.

4. Orange. The genuine orange-coloured paints are, *red orpiment*, and *orange-lake*: the first of these is a sublimate formed of arsenic and sulphur; the other may be prepared from turmeric, infused in spirit of wine, having its colour struck upon calx of tin, and brightened by a solution of that metal. The different shades of orange may, however, be prepared

pared by mixing red and yellow colours together in due proportions.

5. YELLOW.—The chief colours of this kind are, Kings and Naples-yellow, Dutch-pink, and Turbith-mineral.

Kings-yellow is prepared from arsenic. Its colour is very beautiful, but apt to fade, on which account, as well as from its great price, it is but seldom employed.

The basis of *Naples-yellow* is lead: it therefore frequently turns black; is particularly liable to be spoiled by iron, when moist, and should never come in contact with that metal, unless previously ground in oil.

Dutch-pink is said to be prepared by striking the colour of yellow berries upon chalk finely levigated. This, however, we doubt much, as its basis is harder and more gritty than chalk, and its colour more durable than others prepared in a similar manner.

Turbith-mineral is, at present, but little used in painting, though it appears to be very durable, and is therefore preferable both to Kings and Naples-yellow.

6. GREEN. The only simple green of a tolerable degree of brightness, is *verdigrease*, or its different preparations: though far from being durable, it may be rendered more so, as a water-colour, by dissolving it in the pure tartarous acid.—A green colour may be made by compounding Prussian, or other blue, with yellow; but it is by no means fixed, and much inferior to common verdigrease.

7. BLUE. The principal blue colours are, Prussian and Dutch Blue, Verditer, Smalt, Bice, and Indigo.

Various processes have been adopted for the making of *Prussian-blue*, of which we shall select the shortest.

Take 3 lbs. of dried ox's blood, 4 lbs. 8 oz. of quick-lime, 2 lbs. of red tartar, and 1 lb. 8 oz. of saltpetre. Let them be calcined and lixiviated, when the lye should be poured into a solution of 4 lbs. of alum, and 1 lb. of green vitriol. This operation will produce the finest blue; but the quantity will exceed little more than 8 oz. and 4 drams.

Dutch-blue. See BLUE, vol. i. p. 296.

The preparation of *verditer* is studiously concealed, so that the best chemists of Europe have been baffled in discovering its component parts. It is very bright, and has a considerable tinge of green. This colour is durable in water; but, like verdigrease, dissolves in oil, and is subject to the same inconveniencies.

Smalt is glass coloured with zaffre; a preparation from cobalt. It is, in general, so grossly pulverized as to be unfit for painting, and its texture is so hard, that it cannot easily be levigated. Its colour is exceedingly bright and durable; and, if finely pulverized, is little inferior to Prussian-blue.

Bice is prepared from the *Lapis Armenus*, a stone which was formerly brought from Armenia, but now from Germany. Bice bears the best body of all bright blues in common use, but it is the palest in colour. Being somewhat sandy, it is necessary to grind it very fine, and to wash it well, previously to its being used. It is as durable, and yields nearly as good a colour, as Prussian-blue.

Indigo is but little employed in painting, either in oil, or water, on account of the dullness of the colour. It requires no other preparation than that of being washed over, before it is used.—See INDIGO.

8. PURPLE. The only simple colour of this kind at present, is colcothar of vitriol, or *crocus martis*. A beautiful purple lake may be prepared from logwood, by means of a solution of tin. As this mode of preparing colours is but little known, we shall give a few hints respecting it, under the subjoined head of COLOURING MATTER.

9. BROWN. The chief Brown colours are bistre, and brown Pink.

Bistre is prepared from the most glossy, and perfectly burnt soot, pulverized, passed through a fine sieve; then baked in a little gum-water, and formed into cakes. This is a very useful colour in water, being exceedingly fine and durable, and not apt to spoil any other colours with which it is mixed. The *brown-pink* is said to consist of chalk, tinged with the colouring matter of fustic, heightened by fixed alkaline salts. It is, consequently, very perishable, and seldom used.—See also CHAFER, vol. i. p. 486.

COLOURING MATTER is contained in almost every flower and root of vegetables, and may be extracted by a very simple process. The Dutch prepare pigments of the most beautiful shades, for instance, a very fine azure blue, from the blossoms of the corn blue-bottle, *Centaurea Cyanus*, L.—a delicate red, from the fresh leaves of roses, especially the small French rose;—an excellent violet from the flowers of that name, &c. in the following manner: Take the roots, leaves, or flowers of whatever quantity is desired, bruise them nearly to a pulp, put them into a glazed earthen vessel, pour a sufficient quantity of filtred water over them, and add a table spoonful of a strong solution of pure pot-ash to every pint of the former. Boil the whole over a moderate fire, till the liquor is evidently saturated with the colour afforded by the vegetable; then decant the fluid part, either through blotting paper, or cloth, and gradually drop into it a solution of alum, when the colouring matter will subside at the bottom. This powder should again be washed in several fresh waters, till they pass away perfectly tasteless: at length, it must be once more filtred through paper, and the remaining substance perfectly dried. From this preparation are afterwards manufactured the finest pigments, or water-colours, of the shops, by triturating them on marble stones, with the addition of a little clarified gum-water, and then forming them into cones, cakes, &c.

Having already, under the different heads of plants, mentioned the various purposes to which they may be usefully applied, in the arts of colouring, dyeing, tanning, &c. it would be superfluous to enumerate them on this occasion—a task we are necessarily obliged to defer, on account of the great variety of vegetables which will occur in the sequel of the alphabet. To enable, however, those readers who are engaged in any particular art, or trade, to take a comprehensive view of every useful fact connected with their respective pursuits, we take this opportunity of informing them, that we intend to give a copious and universal *Index of Reference*, at the conclusion of our labours. By the assistance of such an index, they will be enabled immediately to avail themselves of all the modern improvements, discoveries, and inventions, relative to any subject treated of in the *Domestic Encyclopædia*; whether it be recorded under a distinct head of the alphabet, or only incidentally mentioned.

COLT, the young of a mare, usually called a *horse-colt*, in order to distinguish it from the female, which is denominated a *filly*.

Colts should always be bred from a sound stud, as their future utility, in a great measure, depends on that circumstance; and also on the manner in which they are reared. In the first summer, they may be permitted to run with the mare till Michaelmas, or longer, if the weather continue mild. They should then be weaned, and kept in a stable, with a low rack and manger for their hay and oats; but the latter should be crushed in a mill, before they are given to them, as this necessary precaution will prevent the distension of their lower jaw-veins; which would otherwise attract the blood and humours down into the eyes, and occasion loss of sight. We would particularly recommend a strict attention to this circumstance; as the blindness we frequently observe in colts, is not to be attributed to the heating nature of the oats, but solely to the difficulty with which they are chewed.

The feeding of colts with grain is attended with another advantage, namely, that their legs do not become thick and ill-shaped; while they on the whole grow broader, and better knit, than if they were fed only with bran and hay; and will also be more able to endure fatigue.

Colts should be carefully kept from wet and cold; as they are extremely tender, and would be greatly injured by either. During fine weather, however, they may be allowed to pass an hour or two in the open air, when they should be conducted to the stable. By this treatment, they will acquire a habit of docility; and, when broken in, will bear the saddle quietly; which operation should not be undertaken till they are at least three years of age.

These young animals are subject to various disorders, the most fatal of which is a cough, that generally attacks them when they are about six months old, and is accompanied with a visible decay, arising from certain pellicles, or skins frequently separated from their interior organs, which obstruct their breathing, and at length destroy them. To remedy this distemper, farriers commonly prescribe, that the bag in which they were foaled, should be dried, a small quantity of it pulverized, and given them in milk. If the bag has not been preserved, the lungs of a young fox may be substituted for that powder. We believe, however, that there is more superstition than merit in these remedies, and make no doubt that sweet cow's-milk, in which a little mutton suet has been dissolved, or the beestings alone, would be found equally beneficial.

COLTS-FOOT, or *Tussilago*, L. a genus of plants forming 21 species, of which only three are natives:

1. The *Farfara*, or common colts-foot, which grows in pastures, in moist, stiff, clayey soils, and also on lime-stone rubbish. It is mostly found in fields that are over-cropped, or exhausted, and often severely exercises the patience of the

farmer. It may be eradicated by ploughing up the soil, carrying the plant away when rooted out, and laying the fields down to grass. Hog's dung has also been employed with success for this purpose; and, if spread on the land in the proportion of 15 or 20 loads per acre, it will certainly extirpate this troublesome weed. Colts-foot produces yellow flowers that are in bloom in the month of March or April, and are soon succeeded by large roundish leaves, which have a bitterish, mucilaginous taste, and constitute the principal ingredient in British herb-tobacco. They are eaten by sheep, goats, and cows, but refused by horses and hogs. Formerly they were much used in coughs and consumptive cases; and have also been found of considerable service in scrophulous complaints; a decoction of these leaves having sometimes succeeded, where sea-water had failed.

2. The *Petasites*. See BUTTER-BURR.

3. The *Hybrida*, or long-stalked colts-foot, which possesses no peculiar properties.

COLUMBINE, the Common, or *Aquilegia vulgaris*, L. is a native plant, growing in hilly woods and thickets. It is perennial, and blooms in July. The beauty of its flowers, and their uncommon diversity, both in shape and colour, have introduced this plant into gardens. It is eaten by goats, but sheep are not fond of it, nor is it relished by cows, horses, and hogs.

COLUMBO-ROOT, or COLOMBA-ROOT, an article lately introduced into medicine, chiefly by Dr. PERCIVAL. The natural history of the tree, from which we obtain it, is but imperfectly known: it grows near the town of Columbo, in the island of Ceylon. The most active part of the root is its bark, which is imported in circular pieces, consisting of a cortical, woody, and medullary lamina, and having a rough surface. It has an aromatic odour, but a disagreeably bitter, and somewhat pungent taste. It is possessed of antiseptic properties, and has been found efficacious in correcting and preventing the acrimony of bile.

The Columbo-root is much used abroad in diseases attended with bilious symptoms, and in an impaired state of digestion. It has a remarkable tendency to restrain the fermentation of alimentary matter, without affecting the stomach; a property in which it resembles mustard. Nor is it attended with any heating effect, and may therefore be advantageously taken in pulmonary consumption, and other hectical cases, both with a view to correct acrimony, and strengthen the digestive organs. Farther, it does not rise on the stomach, and agrees well with a milk-diet, as it abates flatulence, and is totally divested of acidity. Hence, we regret that this valuable drug is not regularly imported; and that it is frequently found either in a very decayed, or adulterated state.—The common dose is from ten to fifteen grains, every three or four hours, for adults; and from two to six grains, for children.

COMB, an instrument made of horn, ivory, or other materials, and used for separating, cleaning, and dressing flax, wool, hair, &c. Combs for wool are prohibited to be imported into England.

A very useful *Comb-pot* was invented, a few years since, by JOHN ASHMAN, an ingenious person employed by Messrs. DANIEL and

Thomas Dyke, of Sarum. It consists of an almost cylindrical furnace for water, which contains a smaller one, keeping the suds of the second washing of the wool, to be used with the next quantity of wool, the first way. The whole being a manufacturing process, we refer the reader to the "*Letters and Papers of the Bath and West of England Society*;" or to the 7th vol. of the "*Repertory of the Arts and Manufactures*," where he will find it described, together with an illustrative engraving.

In June 1796, a patent was granted to Mr. William Bundy, of Camden-town, Middlesex, for a machine for cutting and making combs; a full description of which, together with a plate, is inserted in the 11th vol. of the last mentioned work.

Combination. See Artificer, vol. i. p. 118.

COMFREY, the Common, or *Symphytum officinale*, L. a native perennial plant, which grows about two feet high, is found on the banks of rivers, and wet ditches; and produces yellow-white flowers, in the months of May and June. It is eaten by sheep and cows, but horses, goats, and hogs refuse it. The leaves of this plant impart a grateful flavour to cakes and panada; the young stems, when boiled, are excellent and nutritious eating. A decoction of the stalks, with leaves and flowers, gives to wool prepared by a solution of bismuth, a fine and permanent brown colour.

But the most useful part of the Comfrey, is its viscid and mucilaginous root, which may be classed among the neglected treasures of the vegetable kingdom. These roots are, at present, chiefly employed by colour-makers, who, by means of a decoction made of them, extract the beautiful crimson colour from *gum-lac*. The natives of Angora, who possess the finest breed of goats in the world, prepare from the comfrey-roots a kind of glue, that enables them to spin the fleece into a very fine yarn, from which camblets (See vol. i. p. 425) and shawls are manufactured. The Germans have lately employed the same mucilage for correcting the brittleness of flax, and roughness of wool, in spinning: this preparation neither soils the fingers nor the yarn, and may be preserved in a fresh state for many days, in close wooden boxes.

Tabernamontan, in his *German Herbal*, relates a curious fact, which, if not exaggerated, would be of great value in the important process of *tanning*, and rendering leather *water-proof*. He boiled, in a pailful of water, ten pounds of the fresh root, dug out in November, till one half the liquor was evaporated: with this decoction, when cool, he repeatedly dressed the leather which, thus prepared, became not only more durable than by any other method, but it always remained pliable and elastic.—M. Dörffurth, an apothecary of Wittenberg, in Germany, also employed these roots in his experiments on tanning, with considerable success. After drying and reducing them to powder, or cutting the fresh roots into small pieces, he infused them in a proportionate quantity of water, frequently stirring the mass, till it acquired the consistence of treacle. It was then allowed to stand at rest several days, till the fibrous and woody part had subsided, when the clear fluid was poured off, or passed through a basket lined with straw. By dropping diluted oil of vitriol into this liquor, he precipitated the mucilaginous part, which was again filtred and rendered fit for another process of tanning, after depriving it of its acidity, by means of a lye made of common pot-ash. —Another German writer, M. Reuss, mentions the root of the comfrey among those plants, from which good starch and hair-powder may be prepared.

COMMERCE, the exchange of commodities, or the buying, selling, or trafficking of merchandize, money, or even paper, with a view to obtain profit.

Commerce is at present divided into commerce by *land* and by *sea*; *inland* or domestic, and *foreign*; and by *whole-sale* and *retail*. With respect to *domestic* commerce, we may observe, that it is under the King's supreme protection, as it belongs to his prerogative to establish public markets and fairs; to regulate weights and measures; and to issue money, which is the universal medium of commerce, authority, and currency.

The greater part of the commerce of this country is carried on by collective companies, some of which are incorporated under charters, with an exclusive privilege; a practice which is, perhaps, justly due to the company that first introduces a peculiar branch of commerce; but, when such exclusive right is continued for a kind of perpetuity, we venture to pronounce it to be highly detrimental to the welfare of the nation, as well as to the interests of trade in general.

The history of commerce, being less connected with the object of this work than its influence on the moral and physical prosperity of a people, we shall add only a few aphorisms, which appear to us fully established, by the evidence of ancient history, as well as from the nature and complexion of some recent events: 1. That, though commerce doubtless tends to improve the intellectual faculties of man, and renders him more skilful in the various ornamental arts, but especially those of war and luxury, yet at the same time it creates a thirst of power and riches, which by no means contribute to his moral perfection; 2. That opulence, acquired by the rapid succession of fortunate events in commercial speculation, does not stimulate the mind to humane and virtuous actions, in so beneficial a manner as the slow and honest acquisitions of the artist and husbandman. 3. That large fortunes arising from commercial channels, constitute a *rich*, but not a *wealthy* nation; because those individuals who have amassed property, by bold enterprizes, are more prone to apply their money to the support of political and financial schemes, while the industrious cultivator of the soil, or manufacturer, will be disposed to promote the more useful and *permanent* objects of national pride, namely, those of rural and domestic economy.

COMMISSION OF BANKRUPTCY, is that issued by the Lord Chancellor, on persons becoming bankrupt within any of the statutes, and directed to certain commissioners, who are appointed to examine into it, and to secure the bankrupt's lands and effects, for the satisfaction of his creditors.—See Bankrupt.

The proceedings on a Commission of Bankruptcy relate, 1. either to the bankrupt himself; or, 2. to his property.

1. In the former case, a petition should be presented to the Lord Chancellor, by a creditor to the amount of 100l. or by two, to the value of 150l.; or by three, or more, to that of 200l.; in consequence of which, he grants a commission to certain persons denominated Commissioners of Bankrupt. The petitioners are bound in a security of 200l. to make the party amends, in case they do not prove him bankrupt. And if they receive any of the bankrupt's money, or effects, as a recompense for sueing out the commission, so as to obtain more than their due proportion of his estate, they forfeit the same, together with their whole debt.

On receiving their commission, the commissioners first ascertain whether the bankrupt was a trader, within the meaning of the bankrupt laws, and had committed an act of bankruptcy; and, if it be so proved, declare him bankrupt, give notice in the Gazette, and appoint three meetings for the creditors. At one of these meetings are chosen, by a majority (in value) of creditors, the assignees, or persons in whom the bankrupt's estate shall be vested for their benefit. And, at the third meeting, which must be on the 42d day, at farthest, after the advertisement in the Gazette (unless the time for his surrender be especially enlarged), the bankrupt, on notice being served personally on him, or left at his place of abode, must surrender himself to the commissioners, and thenceforth conform in every respect to the directions of the statutes of bankruptcy; or, in default thereof, he is guilty of felony, without benefit of clergy, suffers death, and his effects are divided among his creditors.

When the bankrupt appears, the commissioners are to examine him concerning his trade and effects; and if he give a false statement, or conceal any property to the value of 20l. or withhold any books or writings, in order to defraud his creditors, he is also guilty of felony, without benefit of clergy. But, if the bankrupt has made a true discovery, conformed to the directions of the statutes, and acted to the satisfaction of his creditors, and they (or four-fifths of them in number and value) will sign a certificate to that purport, the commissioners are to authenticate the same under their hands and seals, and transmit it to the Chancellor; who, or two judges appointed by him, on oath made by the bankrupt, that such certificate was not fraudulently obtained, may allow the same, or disallow it, upon cause shewn by any of the creditors. If no cause be shewn, the certificate is granted, and the bankrupt is entitled to an allowance out of his effects, in proportion to the dividend paid. In consequence of such certificate, he is discharged from every debt owing by him at the time he became a bankrupt.

2. With respect to the proceedings affecting the bankrupt's property, the assignees may pursue any legal remedy for getting possession of the same, but cannot commence a suit in equity, compound debts owing to the bankrupt, nor refer matters to arbitration, without the consent of the major part, in value, of the creditors. As soon as they have collected all the effects, and converted

them into money, they must, within twelve months after the issuing of the commission, give twenty-one days notice to the creditors, of a meeting for a dividend, or distribution, at which time they are to produce their accounts, and verify them on oath, if required. A dividend of so much in the pound is then to be made equally and rateably to all who have already ascertained, or may then prove, their debts. Within eighteen months after the commission issued, a second and final dividend is to be made, unless all the effects were exhausted by the first. And if any surplus remain after satisfying all the creditors, it shall be restored to the bankrupt.

For a more complete account of the law now in force relative to bankrupts, we refer our readers to Mr. Cooke's *Bankrupt Laws*, 8vo. 2 vols. 16s. and to Mr. Cullen's *Principles of Bankrupt Law*, 8vo. 10s. 6d. in which the provisions of the legislature, and the judicial decisions, are fully and perspicuously stated.

COMMONS are waste lands or pastures, the use of which is common to the villages or towns in their vicinity.

Commons are certainly of considerable utility in their present state, if they be not too extensive. The poor may derive some benefit from them, without depriving the community of their labour; but when they extend to eight or ten miles in a straight line, and the surrounding country is but thinly inhabited, we conceive them to be extremely hurtful to society; inasmuch as they hold forth an irresistible temptation to sloth and idleness. Although they furnish pasture for a great number of sheep and young cattle, yet we doubt whether this advantage is not overbalanced by the loss which the nation necessarily sustains in being deprived of the labour of numerous persons, to whom they present the means of leading an idle life, and often wasting that time which might be occupied by more useful pursuits. Hence we devoutly hope, that a more general inclosure of the most extensive commons will soon be adopted; a measure which cannot fail to excite a spirit of emulation and improvement among the lower classes, and thus effectually to eradicate habits of indolence. And, if only one-third of such lands could be cultivated to raise grain, we may venture to say, that one acre, so employed, would produce more food than ten acres afford in their present state.

Independently of the great addition to the national wealth, such an inclosure will necessarily prove the means of employing many poor persons, who are starving for want of work, in various distant parts of the kingdom; while the worthless and profligate consumers, especially from large cities, may, by the wisdom of the legislature, be thus reclaimed, and become useful members of that society, to which they have hitherto been a pest, and a burthen. See Farms.

COMPASS, is an instrument of considerable utility for surveying land, dialling, &c. Its structure varies but little from that of the mariners' compass; for, instead of the needle being fitted into the card and playing on a pivot, in this instrument it plays alone; the card being drawn on the bottom of the box, and a circle divided into 360 degrees on the limb. It is particularly useful to travellers, to direct them in their road; also to miners, whom it guides in digging; and may be applied to various other purposes.

To take the declination of a wall by the compass:—Apply that side of the instrument, on which the north is delineated, along the side of the wall; the number of degrees, over which the north end of the needle fixes, will be the declination of the wall on that side. For instance, if the north of the needle point towards the north, the sun may shine on that wall at noon: if it fix over 50 degrees, computed from the north towards the east, the declination will be so many degrees towards the east.

But, as the needle itself, in Britain, declines 13 degrees from the north towards the west, the same number of degrees should always be added to those pointed out by the needle, when the declination of the wall is towards the east, in order to retrieve the irregularity: on the contrary, when the declination is towards the west, it will be necessary to subtract the above-mentioned declination of the needle.

COMPLEXION, generally signifies the temperament, habitude, and natural disposition of the body; but more frequently the colour of the face and skin. In the latter point of view, it has in no small degree exercised the attention of naturalists, who have attempted in vain to reconcile the specific variations among mankind, which are supposed to arise from the difference of colour, stature, or disposition. The arguments drawn from such variations have been proved to be inconclusive, and are now generally exploded. It remains, nevertheless, a difficult matter to account for the remarkable difference of colour existing among different nations.

Without entering into a minute discussion of this subject, we shall only observe, that colour and figure, like other peculiarities, are created by continual, progressive, and almost imperceptible degrees. Nations are susceptible of habits, both mental and corporeal, in the same manner as individuals; which are transmitted to posterity, and augmented by inheritance. National features, like national manners, though slowly, become fixed after a long succession of ages; and, if we can ascertain any effect, produced by a given state of weather, or of climate, it will require only repetition, during a sufficient length of time, to impress them with a permanent character.

The principal colours observable among mankind, are the following: 1. Black; as in the Africans under the equinoctial line, the inhabitants of New Guinea, and of New Holland. 2. *Swarthy*; as in the Moors of the north, and the Hottentots of the south of Africa. 3. *Copper-coloured*; as the East Indians. 4. *Red-coloured*; as the Americans. 5. *Brown-coloured*; as the Tartars, Persians, Arabs, Chinese, and the Africans on the coast of the Mediterranean. 6. *Brownish*; as the inhabitants of the southern parts of Europe, namely, the Sicilians, Spaniards, and Turks, and also the Samoiedes and Laplanders, who border on the Northern Pole; and the Abyssinians, who live in the middle and southern parts of Africa. 7. *White*; as most of the more northern nations of Europe are, namely, the English, Swedes, Danes, Germans, and Poles; to whom may be added the Circassians and Georgians in the north-west of Asia, and also the inhabitants of the islands in the Pacific Ocean.

Those of our readers who may wish to see these observations farther pursued, we must refer to an ingenious *Essay on the causes of the variety of Complexion and Figure in the Human Species*, published a few years since by Dr. S.S. SMITH, Professor of Moral Philosophy in the College of New Jersey. They will also find some excellent strictures on this subject in Mr. CLARKSON's elaborate *Essay on the Slavery and Commerce of the Human Species*, 8vo. 3s. 1788.

Having given this general view of the subject, we cannot suppress the observation, that many unthinking persons are more anxious to preserve and improve their complexion, particularly that of the countenance, than to inquire into their animal economy, and to regulate its different functions. The face, indeed, when not disguised by art, is often the index of health and disease; though it is absurd to consider it as the *cause* of those changes which take place in the body; whereas it exhibits only the *effect*. Hence we may confidently assert, that *all* contrivances of crafty empirics, perfumers, travelling mountebanks, &c. which are pompously offered to the public in daily prints, or by means of bills and pamphlets, containing specious certificates, to induce the giddy, the idle, and unwary multitude (nay, sometimes the lady of rank and fashion), to purchase those "beautifying compositions"—are mournful instances of human folly, and moral depravity. Those superficial persons, however, who are determined to cure the *surface*, and neglect the *inward* state of their decaying frame, by paying little or no attention to their mode of living, we reluctantly consign to the head of COSMETICS: others, on the contrary, whose minds are not irretrievably biassed in favour of *external* applications (at which even the untutored *negro* would smile), we refer to the different articles connected with diet and regimen.

COMPOST, in agriculture, is a certain mixture designed to promote vegetation, instead of dung. To effect this purpose, various experiments have been made, of which we shall mention the following.

An oil-compost was invented by the ingenious Dr. HUNTER, author of the *Georgical Essays*, who directs 12 lbs. of North American pot-ash to be broken into small pieces, and dissolved in four gallons of water. This mixture is to stand 48 hours, when 14 gallons of coarse train-oil should be added. In a few days the alkaline salt will be liquefied, and the whole, when stirred, become nearly uniform. Thus prepared, it should be poured on 14 bushels of sand, or 20 of dry mould, and the whole turned frequently over, for about six months, at which time it will be fit for use. When these ingredients are mixed with one or two hogsheads of water, they will form a fluid compost, to be used with a water-cart. The inventor himself, however, acknowledges that it is much inferior to rotten dung; yet, from various experiments, it appears to be a tolerable substitute for that article.

A compost prepared from putrified animal substances will, doubtless, be preferable to any other manure: the only obstacle to their being more generally employed, is the difficulty with which they are procured. The following is recommended by Dr. HUNTER, of York: Take a sufficient quantity of saw-dust, and incorporate it with the blood and offal of a slaughter-house, putting a layer of each, till it becomes a moist and fetid composition. Two loads of this compost, mixed with three of earth, will be sufficient for an acre of wheat or spring corn, and should be laid on the soil at the time of sowing, and harrowed in with the grain. As it lies in a small compass, it is well calculated for the use of those farmers who are obliged to carry their manure from a distance. Hence we recommend this preparation as a substitute, both for fold-yard and stable-dung, because it is extremely rich, and exerts its fertilizing influence longer on the soil; which, however impoverished, will thus be restored to its pristine vigour.—See also MANURE.

COMPOST, in gardening, is a mixture of various earths, earthy substances, and dung, either for meliorating the soil of a garden, in general, or promoting the vegetation of some particular plant. There are few vegetables which do not delight in some peculiar earth, where they thrive better than in others.—As the reader will find this subject discussed in the alphabetical order of plants, or under the different botanical articles, it would be superfluous to enlarge upon it in this place.

COMPOUND. See HOUSES.

COMPRESSES, in surgery, are very useful applications, for preventing a wound from bleeding, or swelling, as well as in the treatment of aneurisms, ruptures, and *indolent* tumors of every kind. They generally consist of folded pieces of linen cloth, so contrived as to make a gentle pressure upon any particular part.—After the plaster and other dressings are applied, surgeons frequently cover the whole with a *compress*, to secure and fix their applications, and to preserve the parts from the injuries of external air, which would retard the process of healing.

Compresses are likewise frequently used, where no plasters are required; and in this case, either dry, or moistened with certain liquors, which are supposed to be strengthening, emollient, cooling, &c. For such purpose, they are dipped into decoctions of different herbs, into wine, spirits, vinegar, lime-water, solutions of alum, sal-ammoniac, &c. either hot or cold, according to the nature of the case. But the principal use of compresses appears to be that of filling up any cavity or depression of the parts, so that the dressings, especially in fractures, may be applied with greater security; and to prevent the bandages from occasioning a troublesome irritation, or other pain and uneasiness on the skin. Hence they ought to be cut out in circular pieces, nicely adjusted to the diseased parts, and each of them progressively increasing in diameter.

CONDUCTORS, are long rods made of iron or other metal, employed for protecting buildings from the effects of lightning.

The utility of conductors is universally acknowledged, yet it has not been ascertained, till within these few years, whether pointed or blunt ones were the most proper: the latter, however, are now decidedly preferred, in consequence of several experiments, made under the inspection of the Royal Society. Instances, nevertheless, occur of houses provided with pointed metallic conductors, being stricken with lightning; so that this philosophical contrivance has not yet arrived at perfection. We therefore communicate, with satisfaction, the following improvement in conductors, made by Mr. ROBERT PATERSON, of Philadelphia, for which the American Philosophical Society adjudged him the prize of a gold medal. He proposes first to insert, in the top of the rod, a piece of the best *black-lead*, about two inches long, and terminating in a fine point which projects a little above the end of its metallic socket; so that if the black-lead point should, by any accident, be broken off, that of the rod would be left sharp enough to answer the purpose of a metallic conductor. His second intention is, to facilitate the passage of the electric fluid from the lower part of the rod into the surrounding earth. In many cases, it is impracticable, from the interruption of rocks and other obstacles, to sink the rod so deeply as to reach moist earth, or any other substance that is a tolerably good conductor of electricity. To remedy this defect, Mr. PATERSON proposes to make the lower part of the rod, either of tin or copper, which metals are far less liable to corrosion or rust, than iron, when lying under ground; or, which will answer the purpose still better, to coat that part of the conductor, of whatever metal it may consist, with a thick crust of black-lead previously formed into a paste, by being pulverized, mixed with melted sulphur, and applied to the rod, while hot. By this precaution, the lower part of the rod will, in his opinion, retain its conducting powers for ages, without any diminution.

In order to increase the surface of the subterraneous part of the conductor, he directs a hole, or pit, of sufficient extent, to be dug as deep as convenient; into which a quantity of *charcoal* should be put, surrounding the lower extremity of the rod. Thus, the surface of that part of the conductor, which is in contact with the earth, may be increased with little trouble or expence; a circumstance of the first importance to the security against those accidents—as charcoal is an excellent conductor of electricity, and will undergo little or no change of property, by lying in the earth for a long series of years.

CONGELATION. See ICE.

CONSTITUTION, is the particular temperament of the body, which depends chiefly on the state of its humours or fluids, and sometimes also on the solids, but especially the nerves.

It is curious, says Dr. PERCIVAL, to observe the revolution that has taken place, within the last century, in the constitutions of the inhabitants of Europe. Inflammatory diseases occur less frequently; and in general are less rapid and violent in their effects, than they were formerly. This advantageous change, however, is more than counter-balanced by the introduction of debilitating articles of food and drink, several of which were utterly unknown to our ancestors, but now universally prevail. The bodies of men and women are equally enfeebled and enervated: nay, it is no uncommon circumstance to meet with a very high degree of irritability under the external appearance of great strength and robustness. Hypochondriacal complaints, palsies, dropsies, and all those diseases that originate in debility, are now generally endemial; and hysterics, which were formerly peculiar to women, attack at present either sex indiscriminately. A variety of causes must concur to effect so great and universal a revolution. The first of these is the general use of TEA; to which article we refer. The second place may, perhaps, be assigned to the excessive use of spirituous liquors; a pernicious custom which, in too many instances, originates in the former; as, from the lowness and depression of spirits occasioned by the continual use of tea, it becomes almost indispensably necessary to have recourse to something cordial and exhilarating. Hence many sagacious persons pretend to have discovered the grand secret of obviating the hurtful effects of that favourite drug, by mixing a few tea-spoonfuls of *brandy* with each cup of *tea*, especially in dull or hazy weather. Thus, they gradually become tipplers; and hence proceed those odious and disgraceful habits of intemperance, which, we fear, are at present with justice imputed to many females in the middle ranks of society, who, independently of this barbarous custom, would be an ornament to their sex. Indignation and horror would strike our more temperate ancestors, could they behold their degenerate progeny approaching with rapid steps towards that humiliating state of apathy and servitude, in which many nations of Europe, both north and south of this island, languish in deplorable misery.—See BRANDY and SPIRITS.

CONSUMPTION, in medicine, is a very comprehensive term, including all those diseases, in which the body, from a defect of nourishment, is gradually reduced to a state of debility and emaciation. This fatal disorder may arise from a great variety of causes, such as a mal-conformation of the trunk; straitness of the chest; intemperance of whatever kind; obstructions in the pulmonary vessels; suppression of any natural evacuations; as likewise in consequence of pleurisies, coughs, catarrhs, diarrhœas; grief; intense study, &c. More frequently, however, it originates from a neglected cold, especially in constitutions where a peculiar hereditary disposition prevails, without any other discoverable cause.

Accordingly as consumptions are accompanied with fever, or exempt from that symptom, they may be divided into *three* classes: 1. Such as are occasioned by the hectic fever, which, however, is not the consequence of exulcerated lungs: See HECTIC FEVER; 2. Those in which the wasting of the body, as well as the fever, arise from pulmonic ulcers: See LUNGS; and 3. Where the gradual emaciation is unconnected with any febrile symptoms. Of the last species only, which is generally called atrophy, we shall treat in this place.

An *atrophy* always proceeds from a want of due assimilation of the nutritious juices, so that there is obviously a defective appetite, and a vitiated digestion, from the very commencement of the disease. What share the depression of the animal spirits, or an unusual irritability of the nerves, may have in the production of this malady, appears

pears to be doubtful; and they may be considered as the effect, rather than the cause of the complaint which pervades the whole system.

Symptoms of Atrophy: General languor of body and mind; an unhealthy look of the face; a light and unsettled sleep; the appetite now voracious, now nauseating, but usually most desirous of *cold* food; straitness of the breast, and uneasiness after eating; great internal heat and dryness of the tongue; gradual wasting of the body; continual feverishness and thirst, especially during the night; at length, a fever nearly resembling a hectic, and a total privation of strength and spirits.

Children and young persons are very liable to this disease: the former, from the unhealthy milk of a nurse addicted to passions, particularly grief and anger; the latter, from the use of improper food; heavy and feculent malt-liquors; the suppression of night-sweats, especially when occasioned by large draughts of cold beverage; by eating voraciously of crude, thick, heavy and obstruent food; drinking spirituous liquors; long continuance of worms, &c.—Scrophulous adults, and those who have lost large quantities of blood, are also subject to atrophy.

Although this is one of the least dangerous species of consumption, yet, when neglected in its commencement, it frequently proves fatal. Hence the evacuations by stool ought to be strictly attended to, and if the stomach be foul, a gentle emetic previously administered. A diluent and nourishing diet, as circumstances may require; country air; but particularly sweet whey, and the mucilaginous bitters, such as decoctions of the eryngo-leaved liverwort, and the wood of quassia, will be of eminent service. No remedy whatever is, in this complaint, equal to the *warm bath*, which should be gradually reduced to a *cool*, and at length to a *cold* temperature, as soon as the patient is able to bear it.—(See vol. i. p. 190 and 191).—Among the various domestic medicines, which have been occasionally employed for the cure of what is called a *nervous atrophy*, we are from experience convinced, that none are better calculated to restore an emaciated frame, than the conjoined use of the Salep-root, vulgarly denominated Female foolstones, or Meadow ORCHIS (*Orchis Morio*, L.), and the jelly obtained from the red garden-snail (*Helix Pomatia*, L.): Two drams of the former, in powder, boiled in a pint of whey to the consistence of a thick mucilage, ought to be taken twice a day; and from six to eight of the latter dissolved over a slow fire, in equal quantities of milk and water, with the addition of a little cinnamon and sugar, should be used every morning. But, if the patient's appetite be considerably impaired, he may begin the course of these remedies in much smaller doses, which might be imperceptibly increased.

All *symptomatical consumptions*, however, are so far incurable, as they depend upon the particular disorders from which they originate; and, if the latter can be remedied by art, there is no danger to be apprehended from the former: hence it is of the utmost importance to distinguish a simple atrophy from a confirmed hectic, or a pulmonary consumption. In the last mentioned two cases, all the symptoms are more violent, and either the lungs, or the tracheal, mesenteric, and other glands, are exulcerated; whereas, in an atrophy, those glands are only indurated, or otherwise obstructed.—And though we disapprove of those over-nice distinctions, which serve to perplex rather than to instruct, yet, in this case, it is essentially necessary to discriminate between an atrophy and the rickets, scrophula, and that consumptive weakness of children, who pine away for want of a due supply from the breast, or in consequence of diseases preying upon the constitution of the mother, or nurse. Indeed, there is but too much reason to believe, that the foundation of consumptive diseases is often laid in the cradle, by the faulty management of nurses, and the ill-judged tenderness of parents; by keeping children too warm; permitting them the breast too long; and the imprudent administration of opiates;—practices not less detrimental than common. Thus, Dr. R. Russell justly remarks, the process of converting aliment into chyle is injured, the habit of body rendered lax, the blood becomes too serous, the glands destined to moisten the joints increase in bulk, the heads of the bones are enlarged, and the glands of the mesentery, chest, and neck, are obstructed, till at length those of the lungs become also affected.

The alarming increase of consumptions, in this country, affords an ample field fo• medical speculators. It is no less astonishing than true, that about *one-third* of those who die in London, fall victims to that merciless disease, if the bills of mortality be taken as the basis of that calculation. In the three years of 1796, 1797, and 1799, the number of deaths, in the British metropolis, is stated to be 52,237; and among these were, under the general head of consumptions, 17,559. Although the framers of these bills have probably classed many other *chronic* disorders under the head of *decline* and *consumption*, so that, perhaps, one-half may be fairly deducted from their statement, and referred to other maladies, yet even the remaining number of about 3000 annually, in London alone, is sufficient to serve as a warning to every parent, and head of a family, in order to avoid those *causes* which we have before recited.

CONTAGION, infection, or the communication of a disease from one body to another. In some cases it is conveyed by immediate contact or touch; in others, by infected clothes, such as cotton, and particularly wool, which of all substances is the most susceptible, because it is extremely porous. Contagious matter is also, though we apprehend erroneously, said to be transmitted through the air, at a considerable distance, by means of effluvia arising from the sick, in which case the atmosphere is said to be infected.

Some authors have asserted, that the gout and consumption are likewise contagious; but this appears to be very doubtful. It is, however, highly probable, that those diseases may be communicated by the milk of nurses. In temperate climates, like that of Britain, there is but little danger of contracting them by infection, among *adults*; though, in the warmer climates of Europe, it will be prudent to take the necessary precautions against such accidents. To obviate as far as possible all infection, we would recommend to those who are obliged to attend patients, never to approach them *fasting*; and, while they are in their apartment, to avoid both eating and drinking, and also the swallowing of their own saliva. Nor will it be altogether useless to chew myrrh, cinnamon, and similar drugs, which promote a plentiful discharge from the mouth. As soon as a person has returned from visiting an infected patient, he ought immediately to wash his mouth and hands with vinegar; to change his clothes, carefully exposing those he has worn to the fresh air; and then to drink a warm infusion of sage, or other aromatic herbs, which tends to open the pores, and expel, by means of a gentle perspiration, the pestilential virus, if any should have incorporated with the mass of his fluids. It will also be of considerable service to those who are employed about sick persons, frequently to smell vinegar and camphor, or to fumigate the apartments with tobacco, the pungency of which accelerates the circulation of the blood, and is believed to prevent infection, by attracting the contagious effluvia.

Contagion, a disorder peculiar to cattle, more commonly called Distemper, to which we refer. See also Stables.

CONVULSION, a disease attended with irregular and unnatural contraction of the muscles, without sleep. It differs from *epilepsy*, in being accompanied neither with any mental affection, nor with a state of torpor.

The *causes* of convulsions are not always evident, though they generally depend on a certain irritability of the nervous system. —Delicate hysteric women, and men disposed to hypochondriasis, are equally subject to this disorder. Frequently, however, convulsive symptoms take place in consequence of wounds, irritations of the stomach and intestines, worms, poisons, violent cathartics, emetics, &c.

When infants are attacked with convulsions which threaten their lives, the safest expedient will be to immerse them into tepid or milk-warm water, and keep them in that situation, by adding gradually a little hot water, so as to preserve an equal temperature of 96 or 98 degrees, till medical assistance can be procured.

Although we are not inclined to give implicit credit to anonymous authorities, yet we think the following particulars worthy of insertion. A correspondent in the 22d volume of the *Gentleman's Magazine*, justly observes, that convulsions in children, before dentition, generally proceed from acrid, irritating humors produced in the first passages, by living chiefly on acescent food; such fits being preceded by gripings, green-stools, &c. He therefore directs one ounce of white sugar candy to be reduced to fine powder, and 120 drops, or two drams, of the best oil of aniseed, to be dropped upon it: these should be rubbed together in a mortar, then mixed with an ounce of spermaceti, in powder. The dose is twenty grains, to be given in a little milk drawn from the breast, and to be repeated every three or four hours, or oftener, if the uneasiness of the child should require it. To judge from the nature of these ingredients, we are induced to believe, that such a preparation,

paration, if cautiously administered, may be productive of good effects.

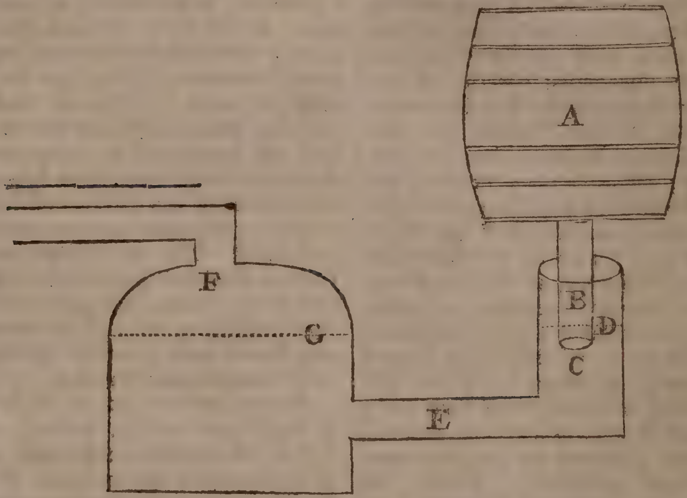
In young persons, however, there is always less danger than in adults; and as we propose to communicate some important matter respecting the treatment of these complaints, under the articles EPILEPSY and SPASM, we shall at present only state another remedy that has lately been used, on the Continent, with uncommon success: it simply consists of the liquid vegetable alkali *(Oleum Tartari per deliquium)*.—Dr. MICHAELIS, of Leipzig; Dr. KARGENS, of Kiel, and several other physicians, have prescribed from 15 to 25 drops of it to be taken for a dose, by children several years old, as well as adults, and frequently repeated, according to circumstances; though we should hesitate to administer so large a dose as 25 drops, every five minutes, to a child three years and a half of age, as has been successfully practised by the first-mentioned gentleman. Hence, we would recommend to regulate the number of drops, according to the age of children, so as to commence with five drops, under twelve months old, adding one drop for every year, and to convey this medicine in a little thin gruel, or weak broth.

COOKING, the art of dressing or preparing food. It is effected by various methods, of which *boiling* is the most common, but also the most objectionable; as it deprives flesh of its nutritious juice. A better mode of dressing animal food is *roasting*, by which its strength is less dissipated; because a crust is soon formed on its surface, that more effectually preserves the nutritive particles from evaporation. Hence, one pound of roasted meat is, in *real* nourishment, equal to double that quantity of boiled animal food.

Many substances, though naturally possessed of salubrious qualities, are rendered unwholesome, by the refinements of cookery. By compounding several incongruous ingredients, to produce a poignant sauce, or rich soup, the cook frequently forms compositions that are almost poisonous. Thus, high seasoning of every kind, pickles, and the like, merely stimulate the palate, and cannot fail to injure the stomach. Hence, the plainest dishes are uniformly the most conducive to health, while they are most easily digested. This self-evident proposition is acknowledged by every reflecting person, but gives the least satisfaction to the epicure, who consults his taste, before he appeals to his warped understanding.

Animal food is generally boiled in half-open vessels, instead of which, close utensils only ought to be employed for that purpose. We therefore preferably recommend the process called *stewing*; as it is not only the most wholesome mode of dressing meat, but at the same time well adapted to retain and concentrate the most substantial parts of animal food. The utility of preparing victuals after this method, having been generally acknowledged, various patents have been granted to persons for the invention of machinery, by which that object may be attained, at the smallest expence. Of these, we shall communicate the following; for the better illustration of which we have subjoined Cuts.

A patent was granted, in December 1793, to Mr. STANLEY HOWARD, of St. Paul's Church-yard, iron-monger, for his invention of a machine which he calls a *Pneumatic Kitchen,* for cooking provisions by steam; in such a way, that no complex machinery is required for supplying the boiler with water, to replace the quantity dissipated by evaporation, nor any pump (the boiler being constantly supplied during the evaporation, without the aid of a cistern); which apparatus may be fixed at a small expence, without any alteration of the chimney; and, when once arranged, requires no repair. The steam-boiler, and cooking-vessels, being made in the usual way, the former is to be supplied with water by a fountain-reservoir, marked A, which is to be placed at a convenient distance from it, with its discharging tube, marked B, inserted in a cistern, or pipe, marked C; in which the surface of the water will, by means of the fountain, be preserved always at one height, pointed out by the letter D: and by a communication marked E, from the said cistern or pipe, with the steam-boiler, marked F, the water therein will, during the evaporation, be preserved at a height corresponding with such cistern or pipe, and always at the same level, marked G. By means of the fountain above-mentioned, the necessity of cocks and pipes, or pumps, for supplying the boiler, is obviated; and the supply rendered more immediate, more certain, and at the same time more simple, than by any method hitherto contrived. The fountain may be made of any materials, or in any form, suited to the purpose.



A patent was likewise granted, in December 1796, to Mr. James Tate, of Tottenham-court-road, iron-monger, for a *portable cooking machine,* for the use of officers in the army or navy, which is provided with lamps. The patentee directs a lamp to be made with any number of burners, or wicks, according to the size of the machine, and they should be placed in one or more straight lines. To one side of this lamp he fixes an oven, for the purpose of washing, or baking; one side of the former is applied to one of the latter, in an inclined direction, so as to come in contact with the flame of the wicks. On the other side of the lamp, he places another oven, which may be either with a straight side next the lamp, or may incline in the same direction as the former; but, if this latter oven incline from the flame, it will serve only to keep any fluid or solid substances in a hot state. The two sides of the ovens will form a flue, or chimney, and convey the remainder of the heat upwards to a vessel of any shape, which may be put over them, for the purpose of raising steam, either to turn a jack, or boil water for tea, &c.; and on the top of which, another steaming vessel may be placed. A frying, or boiling pan may also be occasionally substituted for that last mentioned. Any of these utensils can be used separately with, or over, the lamp; and, if baking or roasting only be required, that purpose will be better effected, by having an oven so constructed as to receive the whole heat of the lamp, or lamps, which ought to be surrounded with a case, for confining the flame, with an open space at the bottom to admit the heat, and another at the top to give it vent.

FIG. 1.

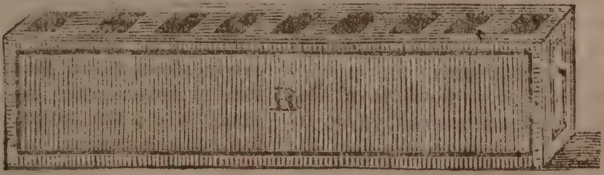
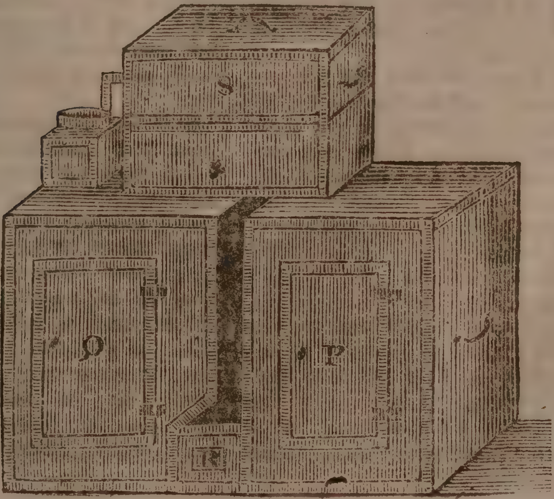


FIG. 2.



Description of the different articles, as they are combined to form this machine, when made portable.

Fig. 1. R, is the lamp for the machine.

Fig. 2. is the lamp, in combination with the two ovens, and the boiler or vessel for raising steam, and boiling any substance in water. P, is the baking oven. Q, is the heating oven. R, the end of the lamp; and S, is the vessel for boiling in, and raising steam for other purposes.

This machine, and its various component parts, may be constructed of any of the different metals, of which similar articles are usually made. And, though it is at present described only as operating with a lamp and oil, yet the patentee proposes to construct such as may be used with common fuel, as wood, coal, &c. upon different scales or sizes.

COPAIBA, or BALSAM of COPAIBA, a liquid resinous juice, issuing from incisions made in the trunk of the *Copaifera balsamum*, L. a tree growing in the Spanish West Indies, of which there is only one species.

The juice is clear and transparent, of a whitish or pale yellowish colour, an agreeable smell, and a bitterish pungent taste. It is usually about the consistence of oil; when long kept, though retaining its transparency, it becomes nearly as thick as honey; and, unlike other resinous juices, does not acquire a solid state.

Genuine balsam of copaiba dissolves entirely in rectified spirits, especially if a little alkali be previously added to the liquor: the solution has a very fragrant smell. When distilled with water, it yields a large quantity of a limpid essential oil: and in a strong heat, without addition, an oil of a blue colour.

With respect to the medicinal properties of this balsam, it is said to be both corroborant and detergent. It strengthens the nervous system, tends to open the bowels, in large doses proves purgative, and promotes the secretion of urine. It has also been recommended in dysenteries, and in diseases of the breast and lungs. FULLER observes, that he has known very dangerous coughs, cured by the use of this balsam alone; and though, being hot and bitter, it produces good effects, even in hectic cases. We advise, however, great circumspection in its use; as it can be of service only in particular circumstances. The dose of this medicine, should not exceed from 20 to 30 drops. It may be conveniently taken when mixed with a thin syrup, or in the form of an emulsion, into which it may be reduced, by triturating it with a thick mucilage of gum arabic, till both ingredients are well incorporated, and then gradually adding a proper quantity of water.

COPAL, improperly called *Gum copal*, is a resinous substance obtained from the concrete juice of the *Rhus copallinum*, or narrow-leaved sumach, a native plant of North America, known there by the name of *Beach-sumach*. This resin is imported in irregular masses, some of which are transparent, of a yellowish or brown colour, others are whitish and semi-transparent. It possesses a more agreeable odour than frankincense, but is, unlike other gums and resins,

sins, neither soluble in water nor in spirit of wine. By these properties it resembles amber; which has induced some to consider it a mineral bitumen similar to that substance. It yields on distillation an oil, which, like mineral petrolea, is indissoluble in spirit of wine.

Copal itself is soluble in the essential oils, particularly in that of lavender, but not easily in those obtained by expression. It may, however, be dissolved in linseed-oil, by digestion, with a heat very little less than is sufficient to boil it.

A correspondent in the 17th vol. of the *Transactions for the Encouragement of Arts, &c.* informs us, that copal may be dissolved in spirit of turpentine by the following process: Having prepared a glass vessel, of sufficient capacity to contain at least four times the quantity intended to be dissolved, and which should be high in proportion to its breadth, reduce two ounces of copal to small pieces, and put them into the vessel. Mix a pint of spirit of turpentine with one-eighth of spirit of sal ammoniac; shake them well together; pour them on the powder, cork the glass, and tie it over with a string or wire, making a small hole through the cork. Set the glass in a sand heat, so regulated as to make the contents boil as quickly as possible, but so gently that the bubbles may be counted as they ascend from the bottom. The same heat must be kept up exactly till the solution is complete. It requires the most accurate attention to succeed in this operation; for, if the heat abate, or the spirits boil quicker than is directed, the solution will be impeded, and it will afterwards be in vain to proceed with the same materials; but, if properly managed, the spirit of sal ammoniac will be seen gradually to descend from the mixture, and attack the copal, which swells and dissolves, except a very small quantity. It is of much consequence that the vessel should not be opened till some time after the liquid has become perfectly cold; as it frequently happens that the whole of the contents are blown with violence against the cieling.—The spirit of turpentine should be of the best quality.

The method of dissolving copal in alkohol, is as follows: To half an ounce of camphor, add a pint of alkohol; put it in a spherical glass, with four ounces of copal in small pieces; set it in a sand heat, so regulated that the bubbles may be counted as they rise from the bottom, and continue the same heat, till the solution is completed.

Camphor acts more powerfully upon copal than any other substance. If the latter be finely powdered, and a small quantity of dry camphor rubbed with it in the mortar, the whole becomes in a few minutes a tough coherent mass. The process here described, will dissolve more copal than the menstruum will retain, when cold. Hence, the most economical method will be, to let the vessel which contains the solution, stand for a few days; and, when it is perfectly settled, to pour off the clear varnish, and leave the residuum for a future process.

Copal will dissolve in spirit of turpentine, by the addition of camphor, with equal facility, though not in the same quantity, as in alkohol.—The vehicle employed in dissolving this resin dries very quickly, and is therefore, in some cases, really attended with disadvantage; but this objection may be removed by the following process: Take a pint of nut, or poppy oil, put it into a large earthen vessel; let it boil slowly over a moderate fire; add by degrees two ounces of white lead, and stir it continually, till the whole is dissolved. Prepare a pint of the copal-oil varnish heated in a separate vessel; pour this gradually into the hot oil, and stir them together till all the spirit of turpentine is dissipated; let it stand till cold, when it will be fit for use.

It is obvious that, as this is a compound of the copal-varnish with the least exceptionable of the drying oils, it will partake of the properties of each. Although it imparts less brightness and durability to colours than the varnish, yet it may be used by painters in the same manner as any other drying oil, on account of the greater lustre and permanency which such colours derive from it, than are obtained from the common oil varnishes. Notwithstanding we have mentioned specific quantities of the ingredients, it must be obvious that the relative proportions may be varied, accordingly as it is required to dry faster, or slower. It should also be remarked, that both the ingredients must be *hot*; because, if either of them be cold, the mixture will become turbid, and a part, nay, often the whole of the copal, be precipitated: but this inconvenience may be avoided, by mixing and boiling them together, in the manner above directed. Yet, as after some time, a spontaneous alteration takes place, which diminishes, and at length destroys, the drying quality of this mixture; it will be advisable to use it fresh, or at least not to employ it, after it has been prepared longer than a month or six weeks.

This varnish is also applied to snuff-boxes, tea-boards, and other articles. It preserves and gives lustre to paintings, and greatly restores the faded colours of old pictures, by filling up the cracks, and rendering the surfaces capable of reflecting light more uniformly.

COPPER, one of the finest imperfect metals, is found in the bowels of the earth, in the following states.

I. Native or pure copper, which possesses the red colour, the malleability, and all the other properties of this metal, and is discovered in various parts of England and Wales, but more particularly in the county of Cornwall. It is formed into threads or branches, and lies in veins of considerable thickness, contained in blackish serpentine stone, mixed with a brownish red, and covered externally with a greenish nephrites.

II. Mineralized by fixed air; of which there are several varieties: 1. *Red* copper, or hepatic ore of copper, which is known by its dusky colour. It is generally mixed with native copper and mountain green. 2. *Earthy* copper, or mountain green, which is mostly found in a loose friable state, and frequently blended with calcareous earth, iron, and sometimes with arsenic.

III. Mineralized by sulphur, with a small proportion of iron. This is of a deep violet grey, or liver colour, melts with a gentle heat, is ponderous, flexible, and yields to the knife. When broken, it appears of a bright golden colour, and is the richest of all the copper ores, affording from 80 to 90 per cent. of copper, 10 or 12 of sulphur, and a small proportion of iron.

IV. Mineralized by sulphur, with a large proportion of iron, or azure copper ore; it varies from the preceding sort only in the quantity of iron it contains, which sometimes amounts to 50 per cent. It yields 50 or 60 pounds of copper per cwt. the rest being sulphur.

The principal parts of Great Britain, which afford copper, are the counties of Cardigan, Chester, Cornwall, Cumberland, Derby, Devon, Northumberland, Lancaster, Salop, Somerset, Stafford, York, Warwick, Westmoreland; in the Islands of Mann and Anglesey; and also in Scotland.

Copper is less difficult to be purified than iron; and, when exposed to the air, calcines, being converted into a green rust or calx, which is soluble in water, and imparts an astringent taste, as well as pernicious qualities.

When taken into the human body, copper acts as a violent emetic, and is generally considered as poisonous: and, though it has occasionally been prescribed by physicians, it is always an unsafe and hazardous remedy. Hence, the greatest precaution is necessary in using this metal, of which so many kitchen utensils are manufactured. Beside the most scrupulous attention to cleanliness, it is extremely improper to leave any liquid to cool in a copper vessel; for this metal is more easily decomposed by liquids, when cold, than in a heated state.

In order to prevent the deleterious effects of copper, the vessels made of it are usually covered with tin, on the inside. It is nevertheless justly complained, that the tinning of copper vessels is not sufficient to defend them from the action of the air, moisture, and saline substances; because, even when strongly coated, they are liable to rust. This may be remedied by a thicker covering of tin; and a manufacture of this kind was established a few years since at Edinburgh; in which the following method is adopted: The surface of the copper is made very rough, by means of a machine contrived for that purpose; then a thick coat of tin is laid on, and the copper hammered smooth as before. To prevent the tin from being melted, and the surface of the copper from being left uncovered, in consequence of a degree of heat superior to that of boiling water, the tin is alloyed with iron, silver, or platina, in order to diminish its fusibility, and render it capable of being applied in thicker layers on the copper.

A patent was also granted, in August 1770, to Mr. Maurice Crawford, of Edinburgh, for his new method of tinning copper, which would last *ten times* longer than that by any former process. This patent is now expired; we shall therefore communicate the following particulars: The copper must be wrought in the common way, till it is ready for the first *pickling*, which should be performed in the usual mode. It is next *frozen* on the inside, on rough stakes, or by any other method of freezing, which opens the pores of the copper, and causes the tinning to penetrate. It is then to be pickled a second time, and scoured clean on both sides, when it should be coated with salammoniac and grain tin; after which the copper should be well lined with a metal, consisting of one pound of grain-tin, and one pound and a half of zinc, spelter, or other metal of equal wholesomeness and durability: when this operation is performed, the outside should be scoured clean, and *rough-planished* on a bright stake. The inside is also to be rubbed with chalk and water, till the tin become clean, when it is to be polished, and smoothed hard to give it a gloss. Ladles, skimmers, and all such culinary utensils, as require to be tinned on both sides, are to be frozen on a cut stake, in the manner already mentioned, and dipped in the melted metal. By this process, the vessel will be much more beautiful and regular, better calculated to resist the effects of heat, and at the same time prevent fatal accidents.

Copper is likewise applied to various other purposes: when combined with tin and zinc, it is employed in enamel painting, dyeing, &c. If it be mixed with a considerable proportion of tin, it produces what is called bell-metal; if in a smaller quantity, BRONZE (see vol. i. p. 362). With zinc it forms BRASS (*ibid.* p. 326-7), PINCHBECK, &c. according to the proportions used.

By the 2d and 3d EDWARD VI. c. 37, and also by the 5th and 6th WILLIAM and MARY, c. 17, no copper, brass, latten, bell-metal, pan-metal, gun-metal, or shruff-metal, whether clean or mixed (except tin and lead, and also except copper and mundic-metal made of British ore and foreign copper in bars), may be exported, on forfeiture of double the value, and of 10l. for every thousand weight. But, by an order of Council, dated July 3, 1799, no sheet copper, copper in bolt-staves, bars, rings, and nails, or copper in such a state, that can be easily converted into naval stores, shall be exported without leave of the Privy Council, on penalty of forfeiture, besides treble the value thereof, and the ship; 33 GEORGE III. c. 2.

With respect to the poisonous qualities of copper, when introduced into the stomach, it is less dangerous than arsenic; as the former is more easily dissolved.—And though the editors of the *Encyclopædia Britannica* have declared that they have not met with any well authenticated instance of a person who has died in consequence of having swallowed even *verdigrease* itself, yet so many examples have lately occurred, that there is not the least doubt of the deleterious properties of copper. Of the many cases that might be adduced, we shall select one, which is authenticated by Dr. PERCIVAL, of Manchester. A young lady had eaten about 3 or 4 ounces of pickled samphire, strongly impregnated with copper, and had drunk afterwards the 5th part of a pint of vinegar, on an empty stomach. She had not applied for medical aid, for two days, and in the course of ten she died. Dr. PERCIVAL is of opinion, that an emetic, if it had been administered in an early stage, might probably have saved her life. Persons apprehensive of the pernicious effects of copper, have been successfully relieved by castor oil, or clysters; and, if any suspicion arise of metallic salts having been swallowed, the same physician judiciously recommends calcined magnesia, as it will not only decompose them, but at the same time gently contribute to carry off the noxious matter.

COPPERAS, a name given to green vitriol, particularly to that of iron. It is purified and prepared in the same manner as alum and saltpetre, being passed through several lixivia, till it is wholly reduced to crystal. It is used in dyeing wool and hats black, in making ink, tanning leather, and in preparing a kind of Spanish brown for painters.

A patent was granted in May 1791 to Mr. Wm. Murdock, of Redruth, Cornwall, for a method of making (from the same materials, and from processes entirely new) copperas, vitriol, and different sorts of dye, or dying stuff, paints, and colours.

The patentee directs any quantity of what remains after the calcination of mundic, or such other ores as contain sulphur, arsenic, and zinc, to be taken, and washed in water; which is to be placed on the top, or on any other part of the kiln, house, or oven, while the mundic or other ores are burning; the heat of which will cause the water to evaporate; or the water may be evaporated to a crystallizing point, by exposing it to the heat of the sun, after which it should be suffered to stand for 24 hours, or longer, when crystals of copperas, or green vitriol, will be produced. From this process arises a considerable saving; as the ores remaining after fusion, may be applied to various chemical purposes.

CORAL, *Corallina*, L. a genus of insects, consisting of eight species, which are found in the ocean.

There are, properly, but three kinds of coral, namely, red, white, and black; the last of these is the rarest and most esteemed. When coral is first taken out of the sea, the small protuberances on its surface are soft, and yield on expression a milky juice, which effervesces with acids. The cortical part, or the external coat, is not so compact as the internal, and may easily be separated, while in a fresh state. The greatest traffic in this article is carried on at Genoa and Leghorn.

Coral is not unfrequently imitated, by artificial compositions, so as to resemble the real. But this fraud may be detected, by exposing it to fire; as the counterfeit does not afford the alkaline earth, yielded by the genuine coral. The colouring ingredients employed in preparing the former, are cinnabar and minium, both of which are easily ascertained. The natural coral seems to receive its colour from iron, as spirit of vitriol acquires from it a ferruginous taste; and, on calcination, some particles are discoverable among the ashes, that are attracted by the magnet.

Various unsuccessful attempts have been made to extract a fine colour from red coral, the *Isis nobilis*, L. by means of spirit of wine. The method of obtaining it is as follows: Dissolve a pound of sugar in a little water, add to it half a pound of wax, then take a pound of coral, and boil them together. Thus, the coral will part with its redness, and remain in other respects unaltered. In order to prepare this tincture, the wax and sugar must be previously dissolved in spirit of wine.

CORALLINE, or Sea-moss, a branched cretaceous substance, of a white colour. It is the habitation and production of polypi, found on rocks, and sometimes on the shells of fishes. It is celebrated as a vermifuge, and, according to GEOFFROY, may be given in powder, from 10 grains to a scruple, or half a dram per day, with considerably good effect. But we doubt whether it possesses any medicinal virtues, as it is perfectly insipid to the taste, and operates merely as an absorbent earth.

CORD, a combination of several threads of hemp, twisted together by means of a wheel.

Cords are extensively useful for various purposes of domestic life, but more particularly in the rigging of ships; in which case they are, according to their size, called cables, or ROPES, to which we refer. Hence, the manufacture of these articles has become an object of considerable importance.

In the common way of making cordage, it has been found, that, by being twisted too tight, ropes were rendered incapable of raising weights beyond a certain proportion, and that, from the friction occasioned by their inelasticity, they were neither very durable, nor always safe. Various means have been devised to obviate this defect, and several patents have lately been granted, from which we select the following.

In July 1792, Mr. JAMES MITCHELL, of Poplar, and Blackwall, Middlesex, obtained a patent for a method of manufacturing cordage on a scientific principle. It apparently consists in subdividing the twists or cylindrical parts of ropes, or cordage, and giving them a peculiar turn, so as to make them blend and unite; and also to operate in such a manner that the component parts act in spiral directions, similar to parallels. By this mode, the yarns all bear together, so that the cordage acquires an increased degree of tension, as well as a greater power of resisting fluids and friction, and also a more uniform elasticity.

A patent was also granted, in January 1798, to Mr. W. CHAPMAN, of Newcastle-upon-Tyne, for a new method of manufacturing ropes or cordage. The patentee describes his invention to consist in placing those parts that separately twist the rope and *strands* (each of which contains a number of yarns twisted together) at a certain determinate distance. By such means, the process of twisting is not completed through the whole length at once, but only in the intermediate space. With this circumstance, the patentee combines a mode of twisting the cord or rope itself by an arbor or shaft, perforated either through the whole or a part of its extent, and revolving round its own axis; and which, at the same time, twists its several parts, by means of separate arbors or shafts, either perforated or otherwise, each of which performs a like revolution. Thus, not only the operation of twisting the cord or rope is effected, but also that of coiling it up, by the motion of the machine, while both time and length of ground are saved, which, according to the prevailing mode of making cordage, are uselessly occupied.

Another patent which we shall notice, is that granted in August 1799, to JOSEPH HUDDART, of Islington, Esq. for an improved method of forming the strands in the machinery for manufacturing cordage. The leading principle of this invention is, to give the length of the yarns composing the strand, a cera certain ratio, in proportion to the hardness, or compression, with which the rope is intended to be *laid*, and thus to acquire a more equal distribution of the strain upon the yarns, than upon ropes made in the common way. This is effected, 1. By keeping the yarns separate from each other, and drawing them from revolving bobbins, in order to keep up the twist, while the strand is forming; 2. By passing the yarns through a register, which divides them by circular holes (Mr. Huddart says, circular shells of holes); the number in each being agreeable to the distance from the centre of the strand, and to the angle which the yarns make with a line parallel to it, that gives them a proper position to enter; 3. By a cylindrical tube, which compresses the strand, and maintains a cylindrical figure to its surface; 4. By a gauge, to determine the angle which the yarns in the outside shell make with a line parallel to the centre of the strand, when registering; and, according to the angle made by the yarns in this shell, the length of all the yarns in the strand will be determined; lastly, 5. By hardening up the strand, and thus increasing the angle in the outside shell, which compensates for the stretching of the yarns, and compression of the strand. By attending to these directions, every yarn in the strand will bear a strain, when at the point of breaking: and, when laid into a rope, it will acquire additional strength.

CORIANDER, the Common, or *Coriandrum sativum*, L. is an annual plant, growing in corn-fields, on road-sides, and dunghills. This vegetable is raised from seed, generally sown in the month of March, in the proportion of 14lbs. to an acre. It is also cultivated together with caraway and teazel; but as neither of those plants comes up completely and regularly the second year, they are usually allowed to stand for the third summer. If sown with caraway, the coriander requires great care in hoeing, to distinguish it from the former, which is not set out for a crop, till the latter is harvested. When reared alone, the plants of coriander are set out from four to six inches apart, and produce whitish flowers that blow in June or July, and contain two seeds. The leaves of this vegetable have a strong, disagreeable smell; the seeds possess a pleasant flavour; and, when encrusted with sugar, are sold by the confectioners, under the name of *coriander comfits*. They have been recommended as carminative and stomachic; but certainly possess intoxicating, if not deleterious properties: Six drams of them, however, have been taken at one dose, from which Dr. Withering did not observe any remarkable effect.

Coriander seeds are now used only in the bitter infusions and preparations of senna, the disagreeable taste of which they completely overcome.

CORK-TREE, or *Quercus suber*, L. a species of oak indigenous in Spain and Portugal, where it attains the height of from 30 to 40 feet; has a thick, rough, fungous bark, and oval serrated leaves, which are downy underneath.

The bark of this tree furnishes that useful material, *cork*; which, becoming of a thick fungous nature, is separated from the trunk, while a new bark is formed under it, which, in the course of six or seven years, is sufficiently thick for *barking*. Nevertheless, the tree continues to vegetate, and another fresh bark grows under the former, which likewise affords cork in the same period of time.

In the *Gentleman's Magazine* for 1758, we met with the following curious contrivance of a *cork-waistcoat,* for the purpose of preventing accidents by drowning. It was invented by Mr. DUBOURG, and is composed of four pieces of cork, two for the breasts, and two for the back, each being nearly of the same length and breadth as the quarters of a common waistcoat, without flaps; the whole is covered with coarse canvas, having two holes to put the arms through.—There are spaces left between the two back pieces and each back and breast piece, that they may the more easily be adjusted to the body. Thus, the waistcoat is open only in the front, and may be fastened on the wearer with strings; or, if it should be thought more secure, with buckles and leather straps.

The weight of this cork-waistcoat does not exceed twelve ounces, and may be made at a very moderate expence. It is more simple in its form than any other contrivance for a similar purpose. Mr. DUBOURG has made trial of its efficacy in the Thames, and found that it not only supported him on the water, but that even two men, with their utmost efforts, were not able to sink him. Hence it is eminently calculated for mariners, passengers at sea in general, and likewise for all those who resort to bathing-places for the benefit of their health; as the most timorous and delicate person may, with perfect safety, boldly venture with one of these waistcoats into a rough sea. See BAMBOO-HABIT.

The expence of providing a sufficient number of them for the British navy, can be no objection to a nation so gratefully fond of a powerful marine establishment.—Those of our readers who are desirous of obtaining farther information on the subject of *cork-waistcoats,* we refer to a treatise written by Mr. J. WILKINSON, and entitled *The Seaman's Preservation, or Safety in Shipwreck,* printed in 1759, 8vo. 1s. 6d.

Cork is applied to various uses, by different nations. The Egyptians made coffins of it, which being lined with a resinous composition, preserved dead bodies from corruption. The Spaniards burn it, to make that kind of light colour we call *Spanish black,* used by painters. They also employ it to line stone walls; an expedient which not only renders them much warmer, but also corrects their moisture in damp weather.

In medicine, the bark, as well as the acorn of the cork-tree, are reputed to be astringent, after being burnt, reduced to powder, and used externally. But in Britain, the former is principally employed for stopping bottles and casks, and lining the inner soles of shoes and slippers. Cups made of cork are said to be of service to hectical persons, when used as their common drinking-vessels.

CORN, in rural economy, the grains or seeds of plants, which are separated from the ear, and used chiefly for making bread.

There are several species of corn, such as wheat, rye, barley, oats, millet, and rice, maize, or Indian corn, &c. each of which will be mentioned in its alphabetical order: we shall, therefore, in this place, not enter into any particulars relative to its culture, confining

fining ourselves solely to such points as relate equally to the different species.

We cannot but animadvert upon the injudicious practice of cutting corn in *cold* autumns, before it is perfectly ripe; as experience has proved, that, if left standing, the ears will continue to fill, and become heavier, even during the autumnal frosts. Were this latter method adopted, a much greater proportion of flour might be produced; and the grain would neither shrink, nor shrivel, in barns or granaries: it might, at the same time, be prevented from rotting, on account of its immaturity, and the softness or moisture which are the necessary consequence.

Notwithstanding the great care and attention which the husbandman may bestow on the cultivation of corn, his expectations of a plentiful harvest are often frustrated by a variety of disorders, and accidents, to which corn is peculiarly liable.

The first and most formidable is the *smut*, which is caused by vermin breeding in the grain, and thus destroying its substance.—(See vol. i. p. 170 and 171). Their propagation, beside other causes, is evidently facilitated by laying on the soil too large a quantity of crude dung; which, becoming mouldy, promotes the generation of the smut-animals.

Various experiments have been accordingly tried, to eradicate this noxious distemper, with different degrees of success; a few of which, we shall enumerate.—In the greater part of the counties of Devon and Cornwall, on the evening before the wheat is intended to be sown, it is laid on the floor in a heap, on which is poured a solution of lime, slacked with boiling water, and reduced to the consistence of cream: both are then mixed, and left together till morning, by which time the wheat is dry, and fit to be sown.

In other parts of the same counties, the wheat is steeped either in fresh or salt water, for 12, 18, or 24 hours, when it is put to drain for an hour or two, after which, powdered lime is sifted over it, the whole being well mixed with a shovel: it is then thrown together in a heap, to dry previously to its being sown. Few farmers, however, soak it in brine, and a still smaller number of them, substitute animal urine, soap-boiler's lye, &c. In several other counties, there prevails a general practice of employing brine, strong enough to bear an egg, to which powdered lime is added, till it acquires an unctuous consistence. This composition is mixed with the wheat, the evening before it is committed to the ground. In Yorkshire, and several of the adjoining counties, arsenic is substituted for salt: some farmers render the solution thicker, by the addition of lime, while others either sprinkle the wheat with it, or steep and wash the former, then sift lime over it, and mix them as before.

Another method is, to put 70 gallons of water into a tub, at the bottom of which is a hole provided with a staff and tap hose, as in brewing; to this is to be added half a hundred weight of limestone, and the whole well stirred for half an hour, when it is suffered to stand about 30 hours. It should then be drawn off into another tub, and three pecks (42lbs.) of salt added, which, when dissolved, will make a strong pickle, fit for immediate use. But, if sea-water can be procured, half the quantity of salt will be sufficient. A basket of about 2 feet in diameter at the bottom, and 20 inches deep, should then be placed in the pickle, and the corn gradually immersed, in small quantities from one to two bushels; care being taken to skim off the light grains, which ought not to be sown, because many of them are infected with the smut. As soon as this operation is completed, the basket should be drawn up, and drained for a few minutes over the liquor, when it may be repeated, as often as the quantity of grain to be sown may require. This seed will be fit for the ground in 24 hours; but, where it is to be drilled, it should stand for 48: and, if the driller meet with any difficulty in performing his work, it will be necessary to make the pickle more astringent, by adding lime. Seed, thus prepared, may be kept for 5, 6, 7, 8, or even 10 days above ground, without any injury or inconvenience.

Another mode of preventing the smut in corn, was discovered by Mr. R. Treffrey, of Beer, in Flintshire; who, in a communication to Mr. Young, in the 21st vol. of "*Annals of Agriculture*," states, that having rubbed out a quantity of corn, he sowed part of it, unwashed. The remainder, about two bushels, was well winnowed, taken to a brook, and washed in the following manner: A gallon was put into a wire sieve, that had 8 bars to an inch; it was first gently immersed a few times in the water, by which means every smut-ball, or animal, was easily discovered, and taken away; next, the sieve was briskly agitated, for about a minute, when the whole, after being washed, and thrown into a tub with some water, was stirred round with a broom. It was then again put into the sieve, in the same proportion as before, and immersed in the brook, that the remaining particles might sink through the bottom of the sieve, and be carried away by the stream. This wheat was sown in the same field with the former, where no kind of manure could have the least tendency to produce smut-balls among either. The result at harvest proved, that the unwashed corn produced as many smut-balls as grains of wheat, while that which had been immersed in the brook, was almost entirely exempt from the disorder.

We venture to recommend the last-mentioned expedient; for the superiority of gradual washing over that of throwing the whole into a vessel and stirring it, is manifest. By this method, the infectious matter is not only loosened from the grains, but is carried away with the stream, while that, which is only washed in a tub, &c. cannot be totally cleared; for the more ponderous particles sink to the bottom, and remain among the seed-corn after the water is poured off.

Corn is also liable to be *grown, or sprouted*, when it has partly begun to vegetate; for, if the whole of the grain were to bud, it would become unfit for being converted into bread. Hence it is very difficult to preserve sprouted corn, as the opening of the bud occasions it to *heat*, and the moisture it retains, disposes it still more to undergo the process of fermentation. It is also more subject to be attacked by insects, on account of its being sweeter, more tender, and susceptible of heat, consequently more liable to receive their eggs. If left to itself, sprouted corn heats, ferments, and contracts an unpleasant smell, and a bad colour: it also acquires a disagreeably sharp taste, which is communicated to the flour and bread; and, finally, grows mouldy and sour: in this state, it is fit only for the manufacture of starch. Farther, it is ground with difficulty, clogs the mill-stones, chokes the bolting-cloths, and yields but little flour; which is soft and moist, and will not keep for any length of time, especially during warm weather.

We have entered thus largely into this subject, because, from the variableness of the climate of this country, considerable quantities of corn frequently become sprouted: we therefore extract, with satisfaction, the following interesting particulars, for remedying this serious evil, from an ingenious pamphlet published in France.

Sprouted corn should by no means be stacked, but housed and threshed with the greatest expedition. Nor should it be put in a granary together with dry grain, as the latter will thus become moist. Care should also be taken to keep the place well aired; for, in the contrary case, even the latter cannot be preserved.

As soon as sprouted corn is threshed, it should be spread upon the floor, and frequently turned; a door, or window, being left open to give vent to the steam. Sometimes it will be necessary to dry the corn in an oven, after the bread is removed; leaving the door half open, and turning the grain every ten minutes, to facilitate the evaporation of the moisture. When it is thus dried, it should be sifted, and not put into sacks, or in heaps, till it is properly cooled; as it will otherwise become mouldy.

Although some fastidious persons may object to the trouble occasioned by this mode of curing sprouted corn, yet as eight or ten days continual drying will preserve it for a whole year, and render both the bread and flour of a better quality, it surely merits the attention of every diligent husbandman, and will amply compensate his trouble and labour.

There is another disease that frequently attacks corn, which is usually termed *burnt-grain*, of which we have already spoken, vol. i. p. 398. To these may be added, what is called the *spur*, which affects both wheat and rye, but more especially the latter. The grains infested with it, are thicker and longer than the sound ones; their outsides are either brown or black, and their surface rough. If a *spurred* grain be opened, a white flour is perceivable in it, which is covered with another of a reddish or brown colour. The latter has some degree of consistence, but may be easily crumbled between the fingers. Naturalists are unable to ascertain, with precision, the cause of this distemper; but it is supposed to be occasioned by the bite or sting of an insect, that turns the corn into a kind of gall; a conjecture which is partly confirmed by the taste left on the tongue, after eating such grain. The effects arising from the use of corn thus damaged, are said to be malignant fevers and gangrenes, in consequence of which the extremities of the body sometimes mortify, and spontaneously separate, without any pain or effusion of blood.

Among the various inſects which prey upon corn, none is more deſtructive than the *corn-butterfly*, which is generated in a manner ſimilar to that of the common butterflies. It ſettles on one grain, and after having totally conſumed it, its exiſtence is ſuppoſed to be prolonged by eating its own excrement. When it has attained its full growth, it is about one quarter of an inch in length, and half the thickneſs of the grain it has devoured. To exterminate this noxious inſect, it has been recommended to prepare a very ſtrong lye of wood aſhes, to which, when it becomes yellow, as much quick-lime ſhould be added, as will make it of a duſky white: while it is as hot as the hand can well bear it, the groſſer part of the lime ſhould be ſuffered to ſubſide, and the lye poured off into a proper veſſel; into which the corn is to be immerſed by means of a baſket, and quickly agitated; ſkimming off thoſe grains which float on the ſurface. In the courſe of two or three minutes, it may be taken out, and the baſket with its contents ſuſpended on two poles, to drain; after which it ſhould be ſpread on the floor of a granary to dry, while a ſecond baſket undergoes a ſimilar immerſion. This ſimple proceſs not only preſerves the grain from rotting, but at the ſame time deſtroys all thoſe inſects that may have penetrated its ſubſtance.

An oven is alſo employed for drying the ſeed; but, as it is difficult to aſcertain the proper degree of heat, without injuring vegetation, and yet not always ſufficient to extirpate the vermin, it is ſeldom practiſed.

With reſpect to the manner of preſerving it, corn is very different from fruits; as, with proper care, it may be kept in granaries for ſeveral centuries. Far from wiſhing to ſupport that execrable ſyſtem of monopoly, which is but too conſpicuous at preſent, to the injury and oppreſſion of the groaning poor, we ſhall communicate the following directions, with a view to avert any *future* ſcarcity, rather than to enable the avaricious corn-dealer to with-hold his ſtock from the public market. For this purpoſe, the grain ſhould be well dried and cleaned before it is houſed; care being taken to introduce air-holes on the top, and openings to the north and eaſt of the granary: during the firſt ſix months, the corn ſhould be carefully turned, once a fortnight at the leaſt, to prevent it from heating; after which time it will be ſufficient to turn it every month, for about two years, when it will have exhaled all its igneous particles, and no apprehenſion need be entertained, unleſs from the air and adventitious moiſture. Should it nevertheleſs *heat*, from any unforeſeen accident, ſo that there is apprehenſion of its catching fire, ſuch a misfortune may be eaſily prevented, by making a hole in the middle, down to the floor, which will ſerve as a kind of chimney, or flue, for carrying off the heat.

But, notwithſtanding theſe precautions, it frequently happens that *mites* reduce the greater part of the grain to duſt. This ſerious damage may be prevented by rubbing the adjacent places with fetid oils and herbs, ſuch as garlic and dwarf-elder, the ſtrong ſmell of which tends to expel them: beſides, they may be expoſed to the rays of the ſun, which immediately deſtroy them.—One of the moſt effectual means of extirpating both the white and black corn-worm, as well as to secure the grain from the depredations of mice and rats, is that of covering the corn with the branches of the alder buckthorn, or black berry-bearing alder, *Rhamnus Frangula*, L. The exhalations of this plant are so offensive to every kind of vermin, that they not only prevent their generation, but also effect the destruction of those which have been carried in with corn from the fields, or granaries. We state this fact on the authority of Mr. HOCHHEIMER; and as the experiment is not attended with any considerable expence, it certainly merits the attention of the *wholesale* farmer.

Among the numerous suggestions of foreign writers, for preserving grain from the devastations of insects, we shall only mention those of smoking the store-houses with sulphur and tobacco (which, however, renders the corn unfit for vegetation); of covering the heaps of grain either with thin sail-cloth or old sheets, rolling them together when the vermin are settled on the surface, and exposing them to the voracious appetite of poultry in the farm-yard; of brushing them off the walls with hard brooms; of introducing ants, their greatest enemies, into the granary; of exposing dead lobsters; and, lastly, of ventilating the whole building, and frequently stirring the grain; remedies which, of all others, are perhaps the most efficacious methods of averting damage.

For the information of those dealers who avail themselves of *arsenic*, to destroy the rats and mice frequenting their corn-floors, we think it our duty to observe, that such a dangerous remedy ought never to be employed; as it has frequently produced the most fatal accidents, and as the excrements of the poisoned animals, where mixed with the grain, may likewise occasion disorders, the cause of which is not even suspected by physicians. Hence we advise those mercenary economists to substitute a remedy, which will be found equally effectual, and is perfectly safe: it merely consists in mixing two parts of pounded quick-lime with three parts of sugar, and placing at the side of it a separate shallow vessel with water. The heating nature of this composition very speedily excites thirst, and induces those depredators to drink eagerly: in consequence of which the lime is slacked in their stomachs, and proves inevitably destructive.

When corn has been cleared of all impurities, in the manner above stated, it may be kept for a great number of years, nay, for ages, by depositing it in dry pits covered with strong planks; but the safer method is, to cover the heap with quick-lime, which should be gradually dissolved, by sprinkling over it a small quantity of water. This causes the uppermost grains to sprout to the height of two or three inches, and incloses them with an incrustation, through which neither air nor insects can penetrate. See GRANARY.

In order to ascertain the relative value of different species of grain, corn-dealers avail themselves chiefly of the combined criterion of weight and measure. In a commercial point of view, such a method is doubtless the most accurate; but as it cannot be explained without entering into a very diffuse detail, accompanied with numerical tables, we shall communicate

cate to our economical readers only a few practical directions, by an attention to which, they may be sufficiently guided in the sale or purchase of corn in general :

1. Take a handful of grain from a heap, or sack, and compress it closely for a minute ; then pass it from one hand into the other, and attentively examine its flavour, whether it possess any peculiar smell, different from that which is natural to the species : in which case you may conclude that it has been repeatedly exposed to moisture, and undergone a slight degree of fermentation. The flour obtained from such corn, is deficient in measure, of an indifferent quality, and affords neither nourishing, nor wholesome bread.

2. If, on pressure by the hand, the grains appear so solid and smooth that they in a manner glide through the fingers, without having any foreign smell or colour, in this case it may be pronounced perfectly dry, and in a good state of preservation.

3. Should, on the contrary, the corn feel rough, or, if a number of grains, after compressing them by the dry hand, clog together and adhere to the fingers, it may be justly apprehended that such wheat, rye, &c. is *damp*, and possessed of all the bad properties before specified.

As the nature of the present work does not permit us to enter into a minute analytical account of the specific gravity of different kinds of corn, and their relative proportion to each other (which properly belongs to the mercantile speculator), we shall supply this apparent deficiency, by the following comparative view.

Every attentive observer will find, that frequently some species of grain bears a price in the market, far exceeding its relative value, or proportion to other kinds of grain, which, in many instances, may serve as excellent substitutes. From the prices which have prevailed in different countries, during a long series of years, we have derived the following result of numbers :

Wheat	-	-	41
Rye	-	-	32
Barley	-	-	23
Oats	-	-	14

TABLE OF PROPORTIONS.

	Wheat.	*Rye.*	*Barley.*	*Oats.*
Wheat	1 1	5 4	7 4	3 1
Rye	4 5	1 1	3 2	16 7
Barley	4 7	2 3	1 1	8 5
Oats	1 3	7 16	5 8	1 1

It deserves, however, to be remarked, that these proportions occasionally vary, accordingly as the soil of different countries is more favourable to the production of one species of grain than to the other ; and likewise as there is a greater or less demand for particular kinds of corn in the market, especially in barren or unproductive seasons. Thus, in Britain, the price of barley and oats is almost constantly disproportionate to that of wheat, and especially to *rye*, which may, consequently, be considered as the *cheapest* bread-corn. The immense quantities of malt-liquors brewed in this country, and the great number of horses kept for pleasure, are sufficient reasons why barley and oats are sold at prices comparatively higher than their intrinsic value, in relation to wheat and rye. But if the rates stated in the preceding table be adopted in the computation of prices, and the farmer, or corn-dealer, be desirous to know what proportion, for instance, the price of oats bears to that of rye, let him search in the horizontal line for oats, and in front of the perpendicular line for rye: the field, or partition where both meet, contains the numbers 7 : 16, namely, that the price of oats is in proportion to that of rye, as seven to sixteen; and so forth, with respect to the other species of corn here exhibited.

Corn-berries, or Cranberries: See Bilberry.

Corn-cale. See Charlock.

CORN-CHAFER, or *Curculio granarius*, L. a species of insects bearing a resemblance to oblong, soft worms. They are provided anteriorly with six scaly legs, and their head is likewise covered with scales. Some species of these larvae are dreaded for the mischief they do in granaries; as they find means to introduce themselves, while small, into grains of corn, and there fix their abode. It is very difficult to discover them, for they lie concealed within the grain, grow slowly, and enlarge their habitation, in proportion to their size, at the expence of the interior meal, on which they feed.

Corn-lofts are frequently laid waste by these numerous insects, which devour immense quantities of grain. When the corn-chafer, after having consumed all the meal, has attained its full size, it remains within the grain, hides itself under the empty husk, and subsists alone: there it undergoes its transformation, and becomes a chrysalis; nor does it leave the grain, till a perfect insect, when it makes its way through the husk.

One of our foreign correspondents has communicated to us the following recipe for extirpating these predatory vermin, or preventing their devastations in granaries: Take three or four handfuls of the purple loose-strife, or willow-herb, or grass-poly, *Lythrum Salicaria*, L.; six or eight handfuls of water-pepper, or biting snakeweed, *Polygonum Hydropiper*, L.; and two handfuls of narrow-leaved pepper-wort or dittander, *Lepidium ruderale*, L. —put them together in a capacious vessel filled with water, several inches above the herbs, and boil the whole from 15 to 30 minutes, by a moderate heat. After taking it from the fire, add four or six onions, a few cloves of garlick, and half a pound of Epsom salt. When cold, sprinkle the floor and walls of the granary with this decoction; and, if the former be constructed of clay, the sprinkling must be two or three times repeated. The herbs here employed, should not be gathered or decocted, till they are immediately wanted, as they would lose their efficacy by long keeping: hence, the months of June and July are the most proper season for collecting them. Lastly, the floor ought to be previously swept, and completely cleared of all impurities, so that the decoction may be applied as a preventive, in the months of August and September.

CORN-COCKLE, or *Agrostemma Githago*, L. is an indigenous, annual plant which grows in corn-fields, and bears purple flowers in the month of June or July. It is very prolific, and produces a great number of pods, each of which contains from twenty to thirty seeds, somewhat resembling those of the turnip; they impart a strong taste and an unwholesome quality to the bread baked of corn mixed with them: such grain ought, therefore, to be employed in distilleries, or the manufacture of starch.

There is a variety of this species, which produces similar, but smaller seeds than the former, and exhibits a peculiar mode of vegetation, being found within the wheat-ear, one side of which is filled with good grain, and the other with a spurious one, produced by this weed. Hence, husbandmen have given it the significant name of *ear-cockle.* It is by no means so common as the former variety, but is generally attributed to bad husbandry, by which the land is exhausted of its nutritious qualities, and weakened to such a degree as to be prevented from bringing the wheat to perfection; because this plant is never found on lands that are well cultivated, and properly managed. It is eaten by horses, goats, and sheep.

CORN-FLOWER. See BLUE-BOTTLE.

CORNEL-TREE, or *Cornus*, L. a genus of plants comprising six species, of which only two are indigenous.

1. The *sanguinea*, wild cornel-tree, or dog-wood, which is chiefly found in woods and hedges. It produces white flowers, which are in bloom in the month of June, and are succeeded by round berries. The wood of this species is hard and smooth, and is chiefly employed in turnery-ware. Its leaves change to a deep blood-colour in autumn. The berries are bitter, and dye purple; on account of their cooling and astringent nature, they are said to strengthen the stomach; stop fluxes of every kind, and to be very serviceable in fevers, especially if accompanied with a diarrhœa. From one bushel of the kernels of these berries, 16lb. of lamp-oil were obtained by expression. The plant is eaten by horses, sheep, and goats, but refused by cows.

2. The *suecica*, or dwarf-cornel, which is found in mountainous situations, chiefly on the Cheviot-hills, in Northumberland; and in some parts of Yorkshire and Scotland. It is perennial, produces white blossoms, that appear in June or July, and are succeeded by red berries, which are eaten by the Swedes.

CORN-ROSE. See RED POPPY.

CORN-SALAD, or Lamb's Lettuce, *Valeriana locusta*, L. is an annual indigenous plant growing in corn-fields, and producing white-reddish flowers from April to June. It is eaten by cattle, and its young leaves are cut and used in spring and autumn as a salad, being esteemed little inferior to young lettuce. Sheep and canary-birds are equally fond of this vegetable.

CORNS, in surgery, are hard excrescences, consisting of indurations of the skin, which arise on the toes, and sometimes on the sides of the feet, where these are much exposed to the pressure of narrow shoes. By degrees, they extend farther down between the muscular fibres on those parts, and occasion extreme pain.

Various remedies have been suggested for the cure of corns, but their removal is always attended with considerable difficulty. A correspondent in the 63d vol. of the *Gentleman's Magazine* asserts, that after having been afflicted with corns for several years, he was perfectly relieved from them, by the application of brown paper moistened with spittle. It has also been recommended to wrap a clove of garlic in paper, and cover it with hot ashes till it becomes soft, when it should be applied to the parts affected, as warm as they can bear it. But the best cure for these painful excrescences, in our opinion, is to wear constantly easy shoes, to bathe the feet frequently in lukewarm water, in which a little sal ammoniac and pot-ashes have been dissolved, and to apply a plaster made of equal parts of gum galbanum, saffron, and camphor. By persevering in this treatment, the complaint may in a considerable degree be alleviated, and at length totally eradicated. But we cannot omit to caution those who are troubled with corns, never to cut or pierce them with any sharp or pointed instrument; as such imprudent attempts have often been productive of dangerous consequences. Nay, it should be remarked, that every application which is liable to occasion pain to the foot or toes, ought to be carefully guarded against, as being improper and unsafe. Hence the inefficacy of operations performed by pretenders, who are unacquainted with the structure of the human body: and such expedients may be aptly compared to periodical blood-lettings, which benefit the operator, but impoverish the constitution of the biassed patient, whose fluids increase, but progressively become more watery.

CORPULENCY, or obesity, in physiology, is the accumulation of too great a quantity of *fat* or animal oil, which distends the solids to an unnatural degree, by the abundance of granulated matter collected in the cellular membrane.

Corpulency arises from a variety of causes, which may operate separately, or conjointly in the same constitution. It may, however, be principally ascribed, 1. To the introduction of too much oil into the habit, through the channels of nourishment, by which means it is retained in too large a quantity. 2. An over-laxity, or, perhaps, too large a structure of the cells in which it is deposited, so as to admit and retain an immoderate proportion of unctuous matter; 3. To a peculiar disposition of the blood, which renders it liable to separate too easily from its oleaginous particles, and to admit of their being strained off too plentifully by the secretory vessels; or, lastly, to a defective evacuation or expulsion of oil already absorbed, separated from the blood, and deposited in its cells, instead of being discharged through the different emunctories of the body.

Obesity is promoted by whatever tends to soften the blood, and render it less sharp and saline; such as want of exercise and motion, an indolent life, indulgence in too much sleep, &c. It may be removed or prevented by the contrary causes, and particularly by the use of saline and acid food, and drink.

Castile soap has often been employed with success, and is strongly recommended in a discourse "*On the Causes, Nature, and Cure of Corpulency*," by Dr. FLEMYNG, (8vo. 1s. 1760); who directs from one to four drams to be dissolved in a gill or more of soft water, and to be taken every night previously to going to repose.

COSMETIC, any medicine, or preparation, that renders the skin soft and white, or contributes to beautify the complexion.

Various articles have been obtruded on the public attention, by ignorant and speculative persons, as possessing every property that may tend to improve the surface of the body, but which have generally been found to consist of the most hurtful metallic ingredients, such as the various preparations of lead, mercury, arsenic, &c. To those, however, whose decayed countenances seem to justify them in the use of cosmetics, or, who are determined to employ them, instead of attending to the more effectual means of preserving the bloom of their skin, it may perhaps be of service to point out two or three harmless external applications, chiefly with a view to prevent them from using dangerous and pernicious specifics.

According to the late Dr. WITHERING, an infusion of horse-radish in milk, makes one of the safest and best cosmetics.

Another preparation for clearing the skin of pimples and recent eruptions, if assisted by gentle aperient medicines, is the fresh expressed juice of house-leek, mixed with an equal quantity of sweet milk, or cream.

Prof. PALLAS recommends the water distilled from the flowers of the *Nymphœa Nelumbo,* a plant indigenous in the Asiatic part of Russia, on the banks of the Volga; and which, by his account, imparts an agreeable softness and delicacy to the skin of the face and hands.

Frequent bathing will also contribute to the prolongation of youth, and preservation of the external integuments. To these remedies, we venture to add honey-water made to the consistence of cream, so that it may form a kind of varnish on the skin, which, especially when chapped by frost, will be much benefited by this application: and if it occasion any irritation or uneasiness, a little fine wheaten flour, or *pure* hair-powder, should be scattered on the hands or face.

Without exception, the best cosmetic, in our opinion, is *temperance*; as, by avoiding excesses of every kind, the body will retain its natural tone, the uniform circulation of all the fluids will be facilitated, and those disgraceful eruptions, we too frequently observe on the features of the younger part of the present generation, will be utterly effaced.

COSTIVENESS, in medicine, a retention of the excrements, accompanied with an unusual hardness and dryness, so as to render the evacuations difficult, and sometimes painful.

Sedentary persons are peculiarly liable to this complaint, especially those of sanguineous and choleric temperaments; or who are subject to hypochondriac affections, the gout, acute fevers, and bilious disorders.

Costiveness is frequently occasioned by neglecting the usual time of going to stool, and checking the natural tendency to those salutary excretions; by an extraordinary heat of the body, and copious sweats; by taking into the stomach a larger proportion of solid food, than is proper for the quantity of fluids swallowed; and, lastly, by too frequent use of such nutriment as is dry, heating, and difficult of digestion.—To those who are afflicted with this complaint, we would recommend to visit the customary retreat every morning, at a stated hour, and thus endeavour to promote the natural evacuation by moderate efforts; even though they may not perhaps be much inclined, and should not at first succeed; for experience has proved, that Nature will in this respect, by perseverance, acquire a habit of regularity. The most proper time for that purpose, is either early in the morning, or late in the evening.

In many families, costiveness is hereditary. It may also arise from a debilitated state of the intestinal canal, occasioned by diseases, but more frequently from the habitual use of lean meat, game, red port wine, strong malt liquors, and similar articles of food and drink. From whatever cause it may originate, continual exercise in the open air, and abstinence from heating or intoxicating liquors, will be found very beneficial.

In those cases, however, where inveterate costiveness has once taken place, and the usual simple remedies have proved abortive, *carbon*, or charcoal (divested of its oxygen by heat), has been administered with uncommon success. Nor has it in any instance failed to procure the desired relief; though its operation has sometimes been rather too violent: to obviate this inconvenience, we would recommend three drams of carbon finely levigated, to be mixed with three ounces of lenitive electuary, and two drams of carbonat of soda. Of this mixture, from half an ounce to one, and even two ounces, may be taken twice, thrice, or oftener, in the course of the day, as circumstances may require.

COTTAGE, properly signifies a small dwelling-house, independently of any lands attached to it. By stat. 31 ELIZ. c. 7, no man can build a cottage unless he annex four acres of land thereto; except in market-towns or cities, or within a mile of the sea, or for the habitation of labourers in mines, sailors, foresters, shepherds, &c.; as likewise those erected by the order of justices of the peace.—The four acres of land required to constitute a cottage, by the law, are to be freehold, and land of inheritance.

According to WILLIAM MORTON PITT, Esq. the ingenious author of an *Address to the Landed Interest*; there are few parishes without several rough, encumbered, and uncultivated tracts, which might be converted into large gardens, and on which cottages might be built, either by the poor themselves, to be held on lives, or at the expence of the parish. If such habitations were more attainable by the poor, frugality would revive amongst them, and young people would strive to lay up a sum of money for this purpose. The hope of improving their lot is the mainspring of industry, in all stations of life. The prosperity of this country has been attributed, not only to the spirit of enterprize of our merchants and manufacturers, but likewise to the effect, which the possession and security of property have on the minds of men.

The produce of a garden diminishes the consumption of bread, which is the most considerable article of a poor man's expenditure; it is an advantage wholly created by the cultivator's industry, at times when not otherwise engaged, as well as by that of his wife and children; consequently there is so much labour gained to the community.

Every man, who is averse to increase the wages of labour in husbandry, should at least encourage the culture of gardens. The quantity of land to be attached to such a cottage, might be half an acre, of inferior value, namely, about 10s. per acre. The corn in the gardens should be raised by dibbling; a method already practised with success, in many parts of the kingdom. Where 10s. per acre is the value of the land, 5s. per annum might consequently be added as quit-rent:—the fine on putting in a life, should not exceed one year's purchase, computed on the real value. The cottager who builds a house upon this principle, acquires the following advantages: 1. A permanent property, as all improvements are for the benefit of himself and family; 2. Respectability of situation; 3. A diminution of annual expenditure; and 4. That he cannot be dispossessed under any circumstances.

Mr. W. M. Pitt farther observes, that this arrangement will answer in all instances, where a labourer has money sufficient to enable him to build a cottage. But as this is not the case with many, the landlord may, without any risk, advance to any such industrious man, 10l. or 15l. to enable him to erect a cottage, which would of itself be a security for the loan; the money to be issued, in proportion only as the work advances. The cottager should pay interest at 5 per cent., and part of the principal, at least 10 per cent., every year. If he fail in making these payments, his effects should be liable. Thus, he would anticipate, with impatience, the time of discharging the whole debt, that he might enjoy the fruits of his labour, and a comfortable situation. The landlord would also be benefited, by being relieved from the expence of repairs, and especially by the reduction of the poor-rates; he would receive his quit-rent annually, and a fine also, upon a renewal, in addition to the full rent of his land, as well as 5 per cent. interest on the money lent; the whole debt being liquidated in ten years at farthest.

The utility of letting lands to the poor, at an easy rate, is still farther evinced in a letter from the Earl of Winchilsea to the Board of Agriculture, in 1796, from which we extract the following particulars.—By the advantages arising from lands thus employed, the labourers and their families live better, and are consequently more able to endure fatigue. They are more comfortable, contented, and attached to their situation, while they acquire habits of industry and cleanliness, as well as a kind of independence, so that they set a higher value upon their character. The possession of a little property excites their industry: of this the noble Earl gives instances in the labourers on his estates in Rutlandshire; whose first thought, after they have obtained a cow, and land sufficient to maintain her, has been how to save money enough to purchase another, in consequence of which, application was made for an additional quantity of land. Such facts afford a complete refutation of the frivolous objections urged against this salutary measure; and we are happy to state, from our own information, that when offers of this nature were made to industrious labourers, they have been unanimously accepted. We, therefore, sincerely recommend to the landholders of this country, to pursue a similar spirited conduct; and are of opinion, that it would act as an additional stimulus to the industry of the poor, if, on the completion of any inclosure, a certain space of ground were allotted, for the grazing of their cows, during certain seasons of the year.

With respect to the most proper method of building cottages, and adapting them to different situations, for more wealthy families, we again recommend Mr. SOANE'S "*Sketches in Architecture*" (vol. i. p. 100);—and, for erecting the more humble habitations of the indigent and industrious, we believe Mr. MALTON'S "*Essay on Cottage Architecture*" (large 4to. 1l. 11s. 6d.) will be found an useful guide.

COTTON, a soft downy substance; the production of the *gossypium*, L. or cotton-tree, a genus of plants comprising twelve species, all of which are natives of warm climates, though four only are cultivated in fields to a very considerable extent. This plant is propagated by seeds, and when reared in Britain, requires to be kept in a hot-house, where it will produce both seeds and its peculiar down.

The cotton used in the manufactures of Britain, is chiefly obtained from the West Indian plantations. It is, in general, of a pale red; but sometimes so short as to be unfit for spinning. None of the latter sort is exported to Europe, though it might be usefully employed with other materials in the making of hats: the small quantities collected of it, are employed for the stuffing of mattresses and pillows.

The first operation which the imported cotton undergoes, after being picked, is that of *carding*. This was formerly performed by the hand, with a single pair of cards, upon the knee; but, having been found a very tedious process, other methods were soon devised, for affording a quicker and more adequate supply. The earliest improvement for this purpose was made by Mr. JAMES HARGRAVE, a weaver, in the vicinity of Blackburne, Lancashire: it consisted in applying two or three cards to the same board, and fixing them to a stool, or stock, whence they received the name of *stock-cards*.—With these, one woman could perform twice, or three times, the former quantity of work. A still more expeditious method of carding, by means of cylindrical cards worked by the aid of machinery, was afterwards invented, and which is, at present, most generally adopted. From the contradictory accounts current, respecting the original inventor, we cannot ascertain, with precision, to whom the merit of it is justly due.

The next, and most important, improvements in this extensive branch of our manufactures, were made by Mr. ARCHIBALD ARKWRIGHT, a native of Lancashire (who has since received the honour of knighthood), and subsequently of Cromford, in the county of Derby. He first introduced his new method of spinning cotton, in 1768, for which he obtained the King's patent in 1769; and another in 1775, for engines so constructed as to prepare the materials for spinning. The result of Mr. ARKWRIGHT'S various inventions is a combination of machinery, by which cotton is *carded, roved, and spun*, with the utmost degree of exactness and equality.

Other machines have been contrived, and a variety of improvements made, at different times, by various mechanics and manufacturers, two of which, by the same artisan, merit particular notice.

tice. The *first* is called a *mule*, being a kind of union of the *warp*-machine of Mr. ARKWRIGHT's, above described, with that of the *woof*-machine of Mr. HARGRAVE, for *spinning*. The latter process was formerly effected by the hand, upon a machine called a *one-thread wheel*. Being, however, found inadequate to supply the quantities demanded for weaving, various methods were invented, with a view to expedite this manufacture; but with little effect, till Mr. HARGRAVE, in the year 1767, obtained a patent for a second mechanical apparatus, by which a great number of threads might be spun at once; and which is called a *jenny*. This machine has since been so greatly improved, that one person may spin 100 English hanks of cotton yarn per day, each of which consists of 840 yards. The next operation which cotton undergoes, is that of weaving it in a loom, in the same manner as flax or hemp.—See CALICO.

In June, 1796, a patent was granted to Mr. ROBERT MILLER, calico-printer, Dumbartonshire, Scotland, for a method of weaving all kinds of cotton, linen, and worsted-cloths, by means of looms worked by water; and which may be farther facilitated by steam-engines, horses, or any other power: the weaving is performed at considerably less expence, and more expeditiously, than it can be accomplished by the hands of weavers; the cloth thus woven is of a more regular texture, and superior to that wrought by the hand. But, as this patent relates purely to a mechanical operation, solely calculated for manufacturers, we refer the reader to the 8th vol. of the *Repertory of Arts and Manufactures*.

Another patent was granted in April, 1790, to Mr. W. NICHOLSON, of New North-street, Red Lion-square, for his invention of a machine for printing on cotton, woollen, and other articles, in a more neat, cheap, and accurate manner than is effected by the contrivances now in use. The leading principles of this invention, appear to consist of three particulars—1. The manner of preparing the original models, casts, types, engravings, carvings, or sculptures from which the impression is to be made; 2. In applying the ink, or colouring matter to such models, &c.; 3. In taking off the impression, or transferring the ink, or colouring matter from those models, &c. to the paper, cloth, or other materials, upon which it is intended to remain. Those of our readers, who may wish farther to investigate this subject, will find an accurate and minute account in the 8th volume of the work last mentioned.

The utility of cotton is not merely confined to the manufacture of different cloths: it is also capable of being converted into hats and paper. Experiments have shewn, that, if raw cotton be beaten to a sufficient degree, and then reduced to a proper pulp, it will produce a smooth, strong, white paper, little inferior in texture to that commonly made of linen rags.—See PAPER.

COTTON-GRASS, or *Eriophorum*, L. is a perennial, native genus of plants, consisting of five species, the principal of which are the following:

1. The *angustifolium*, or com-

mon cotton-grass, moor-grass, moss-crops, or many-headed cotton-grass. It is found chiefly on marshes and bogs in the county of Stafford, on Birmingham-heath, and near Newport, Shropshire.—In the Island of Skye, in Scotland, this plant is useful to support cattle in the earlier part of the spring, before the other grasses are sufficiently grown. The poorer class of people stuff their pillows with the woolly down of this plant, and also employ it in making wicks for candles.

2. The *polystachion*, or broad-leaved cotton-grass, which grows in the marshy parts of the counties of Northampton; Bedford, near Dunstable; York, Cumberland; and very common in Scotland.

Large tracts of ground are sometimes covered with the white downy fibres of this plant, which flowers from April to June; and subsequently represents the snowy field of winter: its presence, however, indicates a soil productive of *turf*, or peat. Neither cattle nor sheep relish this vegetable, the hairy seed-vessels of which vitiate the hay, insomuch that large conglobate masses have often been found in the stomachs of animals, that died in consequence of feeding on such provender.

Hence the necessity of collecting the down of the broad-leaved cotton-grass, both for preventing the injurious consequences to cattle, and converting it to the following useful purposes. The late Dr. Gleditsch, of Berlin, made a variety of curious experiments with this woolly substance; and found, that in combination with either sheep's wool, or cotton, it could be spun into a very strong and uniform yarn, from which were produced durable gloves, stockings, stuffs, and excellent cloth. He admits, however, that this downy material is more brittle than the fibrous integuments in which the seeds of the sweet, or bay-leaved willow, are enveloped. Nevertheless, we have recently had an opportunity of ascertaining, and think it our duty to announce it to the public, as a *fact* worthy the attention of manufacturers, that both substances before-mentioned, may be prepared by a simple chemical process, in such a manner as to render them eminently fit for being mixed with *improved* animal *wool*, as well as *cotton* and *silk*, nay, even the refuse of *flax* and *hemp*. Clothiers, serge and stocking-makers, hatters, and all other artisans employed in this branch of staple manufactures, may perhaps find it their interest to obtain farther information on this important subject.

Couch-grass, or Couch-wheat: See Dog-grass.

COUGH, a violent, often involuntary, and sonorous expiration, suddenly expelling the air through the contracted glottis. It is excited by any acrid substance, either chemically or mechanically applied to those passages through which the air enters. These are lined with a membrane so exceedingly sensible, that it cannot bear the mildest stimulus, such as a drop of cold water, without throwing the muscles serving for respiration, into a violent convulsion. Hence the air is expelled with a force sufficient to carry along with it the irritating substance; and thus a cough becomes not only useful, but indispensably necessary for the preservation of life; as this effort frees the lungs from every kind of stimulating matter, or foulness, which might otherwise be attended with suffocation. A cough is, therefore, an almost inseparable companion of every inflammation of the lungs, as well as every difficulty of breathing; nay, it frequently takes place, when the purest air enters an excoriated, sore, or too sensible windpipe, and its tender branches. It may also arise from too great an irritability of the nervous system, or even of some particular part, such as the ear; from worms and impurities in the first passages; obstructions of the abdominal viscera; acrimony clogging the glands, and originating frequently from a catarrhal and scrophulous disposition; hysteric weakness; accumulation of sharp humors in the lungs, &c.

From this view of the causes which produce coughs, it will not be expected that we should expatiate on the treatment of the complaint, under every form and variety of circumstances: we shall therefore consider it under the following heads:

I. The *convulsive cough of infants*, in general, proceeds from a foul and disordered stomach, in consequence of too viscid and superfluous food, such as porridge, puddings, cakes, gingerbread, confectionary, &c. It is accompanied either with a voracious appetite, or a total want of it; difficulty of breathing, a tumefied hard belly: nausea, and often vomiting. The breath and excrements of such children are unusually fetid; they seldom cough from the breast, but make efforts to vomit, and throw up a viscid phlegm; in consequence of which, they remain easy for a longer time than usual. Their tongue is always impure, and the cough increases in violence, after meals.

For the cure of this troublesome complaint, there are no better remedies than gentle emetics, and laxatives. A child under one year old, may occasionally take a large tea-spoonful of this mixture; namely, syrup of squills and rose-water, of each one ounce; powdered rhubarb, four grains; and ipecacuanha, two grains. The dose may be repeated every half hour, for three or four times, till it produces vomiting; and, in children two or three years of age, it may be somewhat increased, but never to exceed a dessert-spoonful. After the medicine has operated, a clyster, composed of milk and water, with a little oil and sugar, ought to be given, and repeated every other, or third day, while a sparing diet should be strictly observed.

II. The *convulsive cough of adults*, likewise arises from the disordered organs of digestion, and is frequently the constant lot of tipplers in spirituous liquors, and habitual drunkards. At its commencement there is little or no expectoration; and an inclination to vomit generally precedes a fit of coughing.—The treatment of this malady is similar to that of the same species in children; but, if the paroxysms should be so severe as to threaten suffocation, we advise, from experience, small doses of calcined zinc, from half a grain to one grain at a time, to be taken in a spoonful of luke-warm water, and to be repeated, if necessary, every five or ten minutes.

III. The *catarrhal cough*, which is the most common, and very frequent, especially in the winter season: See CATARRH. Its immediate cause is a defluxion of humours from the salival glands, chiefly on the trachea or windpipe; thus irritating the throat, and producing fits of coughing. The continuance of such efforts to expel superfluous matter, generates another cause of the complaint; for, when this humour glides down into the air-vessels of the lungs, it fills many of their cavities, and becomes, in a manner, inspissated, by the continual exhalation of its minutest parts in respiration. The salival humour, thus thickened, by the joint action of the lungs and the air in breathing, is occasionally raised and brought into the mouth, so that in its passages it excites a fit of coughing. In this situation, especially after *catching cold*, and, with a view to prevent, rather than to cure, a catarrhal cough, the late Dr. LOBB suggested a remedy, which simply consists in chewing any kind of *dry* aliment. As the action of the muscles, in mastication, excites the salival glands, and all other adjacent glandules, to discharge their contained humour, and to mix it with dry food, before it is conveyed to the stomach, where it cannot fail to promote digestion, he concludes that, in this manner, a much smaller quantity of the salival humour will fall into the air-vessels of the lungs, and thus the proximate cause of the cough be gradually counteracted. Hence Dr. LOBB advised his patients to use biscuits of all sorts, though hard bread or crust will answer the same purpose: 1. To eat some mouthfuls of dry food previously to going to bed, which often prevents those fits of coughing that otherwise would disturb their sleep. 2. To resort to the same remedy in the morning, when it will convey the salival humour into the stomach. 3. To repeat it every time during the day, when, by a *tickling* in the throat, they apprehend the approach of a fit of coughing. By such practices, he observes, great benefit has been derived by himself and others. We are, however, inclined to think, that it will be useful only at the commencement of the complaint. And the Doctor likewise adds, that to a patient long afflicted with it, totally deprived of his appetite, and perhaps sunk down into a consumption, it is not so effectual, though always of some service. Those who cannot possibly swallow any kind of solid food, he advises, at least, to chew dry aliment, at the times before specified, and again to part with it: this expedient will considerably lessen the quantity of salival humour, and thus prevent, or shorten, many fits of coughing.

It is a common error, that *all* coughs may be cured by the usual mode of administering oily, diluent, and demulcent remedies. At first, indeed, such medicines may be serviceable, to sweeten the acrid humours then secreted, and to allay the irritation. But, as the compounds of oil, spermaceti, &c. easily turn rancid, and even in a fresh state impair the appetite, and affect the breast, we consider them as extremely precarious: hence we would prefer the chewing of the extract of liquorice, gum arabic, and similar substances, to all *liquid* preparations. If, however, the cough has made such progress, as not to yield to the treatment here alluded to, in this case we can confidently recommend the use of the following acid julep: Three ounces of sweet olive oil, two ounces of syrup of capillaire, one ounce of conserve of roses, and thirty drops of strong oil of vitriol; mix them properly, and take a tea-spoonful or two, frequently. These ingredients form an excellent medicine for adults; but, for children, we would prefer a julep prepared of eight ounces of rose-water, four ounces of syrup of dry roses, and six drops of vitriolic acid; to be taken by spoonfuls, as often as occasion may require, especially if the cough be accompanied with thirst and febrile heat. In the latter cases, the julep should be diluted with sweet whey, which of itself is an incomparable beverage in catarrhal affections.

Lastly, we cannot omit to insert in this place, a remedy which is highly praised by the late Dr. UNZER, of Hamburgh, and the physicians of that city, as being of inestimable value in all obstinate catarrhs, stagnations, and accumulations of humours in the breast; *dry coughs*; and severe bruises near the pectoral vessels, from which suppurations and ulcers may be apprehended. This medicine is a simple decoction of the CALAGUALA, a root lately imported from South America, and now universally preferred to the seneka or rattle-snake root, which was formerly used for similar purposes. Dr. UNZER directs two drams of the calaguala to be boiled in a quart of water, till the fourth part is evaporated, and to drink several cups of the strained decoction, instead of tea. When taken sufficiently strong, and for a proper length of time, it evidently acts on the skin and kidnies, by determining the noxious humours to those outlets. He cautions, however, against a spurious species of that root, which is frequently sold by druggists, instead of the genuine; and an account of which is given by M. GALMETTI, an Italian writer.

We have thus enlarged on the subject, because long-continued coughs generally lay the foundation of consumptive and other disorders, which annually deprive the community of thousands, whose lives might be easily preserved, if they had not neglected the *first* attack.

COUGH, *in farriery*, a disease to which horses are very subject. When injudiciously treated, it is sometimes of long duration; occasions loss of appetite, wasting of the flesh, and, ultimately, consumption. Of this malady there are two principal species: the one is loose, almost continual, and increases to a violent degree, upon the least motion; the other is short and dry, being preceded by a husky, hollow kind of wheezing, apparently arising from obstructed breathing, by the retention of fragments of hay, or corn, in the passage. The latter is usually called an *asthma*, for which mercurial purges are recommended; — the animal should first be bled repeatedly, and in small quantities, till the inflammation and irritability of the glands are allayed; and the blood so attenuated by the constant use of nitre, as to facilitate the circulation through the finer vessels of the lungs. This operation being performed, a ball consisting of the following ingredients should be given, according to Mr. TAPLIN, every morning, for a fortnight or three weeks.

Detergent pectoral balls: Take of castile soap, aniseed, and liquorice powder, each 5 oz.; Barbadoes tar 6 oz., gum ammoniacum 3 oz., balsam of Tolu 1 oz., and honey sufficient to make a mass; which must be divided into twelve balls. —Should the animal not recover from this course, he must be again bled, and treated with mercurials.

With respect to the long, loud, incessant, hollow cough, which increases on the least hurry in exercise, the first step is blood-letting; then a mash should be given, consisting of equal parts of bran and oats, into which, while hot, 4 oz. of honey and 2 oz. of nitre, must be stirred and dissolved. This mash must be repeated, without intermission, every night and morning, and a ball prepared of Turkey figs, Spanish liquorice, aniseed, and liquorice-powder, each 4 oz.; carraway-seeds, elecampane and anisated balsam, each 2 oz.; saffron, ground ginger, and oil of aniseed, each 6 drams; and the requisite proportion of honey to form the whole into a paste, which should be divided into 12 balls, one of which is to be given every morning.

These balls, says Mr. TAPLIN, are powerful, cordial, and restorative; they promote glandular excretion, warm, and stimulate the stomach to an expulsion of wind; enliven the circulation, and invigorate the whole frame.—It will, perhaps, be useful to observe, that some young horses are subject to coughs, when cutting their teeth; in such case, it is necessary to bleed, and give them warm mashes, which, in general, will effectually remove the disorder.

COUGH, *in cattle*, a disease called the *husk*, to which young bullocks are liable. In this dangerous affection, the wind-pipe and its branches are obstructed with small taper worms. It is by farmers generally considered as incurable, though we are of opinion, that fumigations with cinnabar, or with fetid substances, such as tobacco, hartshorn shavings, feathers, &c. might occasionally prove of service, especially if they be cautiously administered by means of clysters.

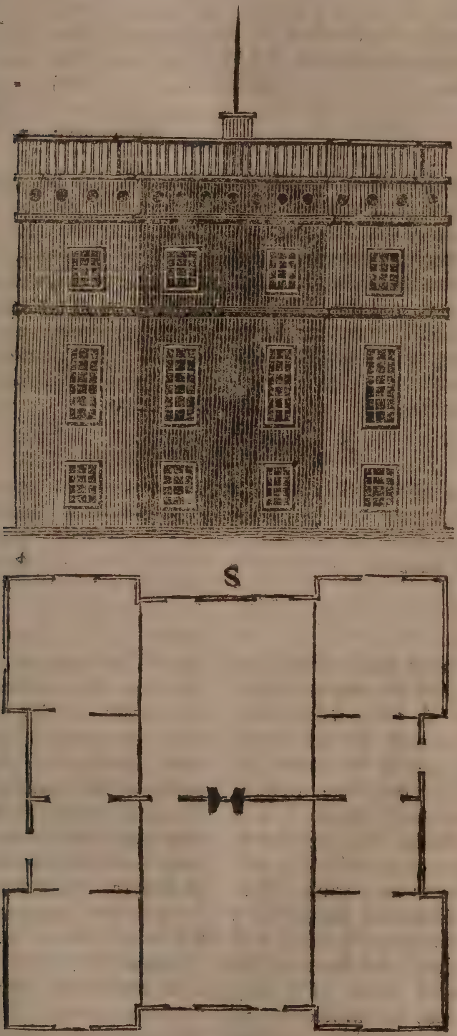
COUHAGE, or cow-itch, as it is erroneously called, *Dolichos pruriens*, L. is an exotic plant, growing in warm climates, especially in the West Indies.—It produces crooked, leguminous, coriaceous pods, thickly set with spiculæ, or sharp hairs, which penetrate the skin, and cause a violent itching. These spiculæ are used in South America in cases of worms, and have lately been employed in Britain for the same purpose: all the hairy part of one pod, mixed with syrup, or treacle, and taken in the morning fasting, is prescribed as a dose for an adult. The worms are said to appear after taking the second or third dose; and, by means of a brisk laxative, the stools are reported, in some cases, to have consisted almost entirely of worms. Although no inconvenience appears to arise from the internal use of this medicine, we doubt its virtues as a vermifuge.

COUNTRY-HOUSES, are those erected in the country, for the use and convenience of private individuals, as opposed to the splendid villas and mansions of the nobility, and more opulent gentry.

It generally happens, that most of the houses burnt in country places, take fire in the roofs, while the family is from home, on a visit, or gone to church. On such occasions, children or servants begin to examine with lights the closets and lofts, which are usually filled with combustibles; or flakes of burning soot not unfrequently fall on the shingled roof. Country-houses are in most instances detached from the immediate assistance of neighbours; hence, in erecting them, security against fire is a point deserving particular attention. In order to promote this truly desirable object, we have annexed a cut of a country-house, founded upon certain principles, adopted by Mr. Bordley, the ingenious American farmer.

The floor of the basement story should be of brick, or flag-stone, raised about a foot above the surface of the ground, but by no means laid on joists over cellars; as these confine the damp air under them, render it pernicious, and there produce a mouldiness and smell, which are communicated to the air of the rooms above, so as to become perceptible. The floor of the second, or best story, should be laid with rough strong boards, or planks, not more than three or four inches wide, nailed down across solid stiff joists, and covered with a thick bed of strong cement. The whole may be spread over with carpets, and the *wash-boards* and *surbase* be of cut stone, or marble. The floor of the third story ought to be laid with thick narrow boards and cement, and the wash-boards of cement rounded off. —The cellars should be under a detached building, or under the staircase of the principal house. It will also be necessary to strengthen the joists of the floors, by inserting pieces of plank between them, which will prevent their being shaken. The utmost care ought to be taken to avoid the use of wood as much as possible. For this purpose, the door and window-frames may be of stone or iron, and the doors faced or lined with the same metal. The joists and boards for the platform-roof and floors, and also for the stair-case, if the same be of wood, should be protected from the contact of fire by cements.

No outside cornice is requisite for a platform-roof, which may be constructed in the following manner: Joists, 12 or 13 inches deep at the big end, are to rest on the middle wall, and to be sloped thence 2-10ths of an inch per foot, to the smaller end on the exterior wall. These joists should likewise be from 2 to 3 inches thick, and from 12 to 14 distant from centre to centre; or they may be throughout of an equal depth, and sloping battens affixed to them, in order to give the platform-roof an oblique direction. At every 5 or 6 feet between the joists, pieces of plank nearly of the same depth with the latter, should be inserted at right angles, which will augment their strength. Stout, rough, narrow boards, 3 or 4 inches in breadth, and 1 inch thick, are next to be nailed down across the joists, with large rugged nails; which ought to be covered over with the following cement, 1 or 2 inches deep: Take one part of burnt, pulverized lime-stone, to which add two of clean sand and brick-dust; let the whole be well mixed together, and only such a quantity slacked, as can be worked up with the trowels, and laid on while it is hot. When the cement is dry, it should be coated with a mixture of three parts of *tar* and one of *fish-oil*, by means of a brush, on a hot sun-shine day. After this, a composition of tar and fish-oil, boiled down to a consistence between tar and pitch, should be laid on, and coarse sand, or small pebbles, sifted over the whole. Then another layer of tar only, of a similar consistence, should be applied, adding likewise small pebbles, but without any mixture of sand. By this process, the roof will acquire such a degree of hardness as to be impermeable to water.



In the annexed design, is a main partition-wall across the place where the chimney is erected, and whence the joists extend 21 feet to the exterior wall. The stair-cases will be most conveniently placed in the corner rooms, or passages. These principles, and the form of the house here represented, being adhered to, the size may be proportioned to the ability and intention of the proprietor. In this design, there are

			Feet.		Feet.
2 Passages, in the clear	21 by $9\frac{5}{10}$	each	200,	both	400
4 Rooms, the corners	12 by 12		144,		576
2 Ditto, - - - -	20 by 21		420,		840
			Whole area -		1816

The cut consists of an elevation and plan, fronting the south. The entrance is either on the east or west sides, which require but little light. Between the cieling of the uppermost story, and the platform roof, there should be a clear space 2 or 3 feet deep, with holes through the opposite walls. The hot air will thus be carried off, and a void space left for inspecting the state of the lower part of the platform. These air-holes may be 8 or 10 inches in diameter, with lattices of wire, or twine, well soaked in the composition of tar and oil, in order to exclude birds; and, during the winter, they should have close shutters on the inside, to keep out the snow.

Dimensions of the Height.

Basement elevation of the walls - - - - - $9+1=10$ feet.
Second story - - - - - - - - - - - $12+1=13$
Third story - - - - - - - - - - - - $9+1=10$
Vent space - - - - - - - - - - - - $2+1=3$
36

The thickness and strength of the walls should be proportioned to their *height*. A *three-story* house would have a wall 36 feet above the ground; one of *two stories*, 26 feet; and that of *one story*, 15 feet: so that if one story require a wall one brick thick, two stories may have the basement one and a half, and three stories two bricks thick. The foundation-wall should be 3 feet deep in the ground, that it may acquire stability, and be out of the reach of severe frosts. For some families, it may be sufficient, and perhaps more convenient, to have only *one* or *two* stories of rooms. The lower the walls are, the greater will be their strength and durability. The *basement* and *second* stories may be divided according to the views of the builder, rather than the annexed Plan. The *third* story, having the four square recesses at the corners of the design thrown into closets about 2 5-10th feet deep, will leave an area, that may be divided into four roomy bed-chambers. The middle wall, which crosses the passages, and divides the large rooms, will support the greatest part of the weight on the roof, and should, therefore, be particularly strong. The joists of the platform extend from this wall, in both directions, north and south, to the exterior walls. The recesses should be as shallow as possible;

1 and $\frac{5}{10}$ of a foot, if clear of wall, will be fully sufficient; for, if they be deeper, they will retain or concentrate heat, and harbour vermin.

The last, and most important point to be considered in the building of a house, is the structure of the chimnies; but as we have already discussed it, and pointed out the best and most improved mode of building them, we refer our readers to that article.—See vol. i. p. p. 516, and following.

COW, in zoology, an animal too well known to require any description.

A perfect cow ought to have a broad forehead, black eyes, large clean horns, a long thin skin, a large deep belly; strong muscular thighs, round legs, broad feet, short joints, and a white large udder with four teats. The use of this animal is equally important for the dairy, and the propagation of its species. For the former purpose, the Alderney breed of red cows is generally preferred, as they are supposed to yield the best milk; though the quantity they produce greatly depends upon the nature and quality of their food.

Grass growing spontaneously on good, sound, meadow land, is in general deemed the most proper nutriment for those cows which are kept for the supply of the dairy. When, however, other green food cannot be procured, the tops and tenderest parts of furze may be chopped, bruised, and given to them. It is affirmed that this vegetable is greatly superior to fodder; as it increases their milk, without imparting any unpleasant flavour. Carrots, oil-cake, cabbages, turnips, potatoes, and burnet (see vol. i. p. 459), are excellent provision, and well calculated to afford beneficial winter-food for this useful animal.

The proper periods for milking cows, during the summer season, if they are well fed, are *three* every day, at the least, and at intervals as nearly equi-distant as possible, namely, in the morning, at noon, and in the evening, just before the approach of night. We are well aware that such practice is not generally followed in England, the cows being milked twice only in 24 hours: this method, however, is against all the rules of good economy; for experience has amply evinced, that if a cow be milked three times a day, she will yield a greater quantity, and as good, if not better milk, than by drawing her teats only twice, namely, in the morning and evening. We are, therefore, induced to recommend this circumstance to the attention of our agricultural readers; for, if by the bad milking of their cows, they lose only half a pint in quantity, they in fact are deprived of as much cream as six or eight pints would produce at the beginning of the operation, together with that part of the cream, which alone can impart a rich and agreeable flavour to butter.

Every precaution ought to be taken in the choice of milkers. When this manual work is roughly performed, it becomes painful to the cow; but if a soft hand be gently applied, the animal seems rather to receive pleasure, and allows the milk to flow plentifully; as she possesses the singular faculty of retaining or parting with her milk. Indeed, instances have frequently occurred, in which one dairy-maid could not obtain a single drop, but another drew the milk in abundance, and without the least difficulty. For the same reason, when cows are *ticklish* (as farmers express it), they should be treated with the most soothing gentleness, and never with harshness or severity. If the udder be hard and painful, it should be tenderly fomented with luke-warm water, and gently rubbed, in order to bring the creature into a good temper.—Thus, she will suffer the milk to flow without restraint; whereas, if she retain, and not allow it to be drawn off freely, it will prevent her from yielding the accummulated quantity, and eventually dry up her udder. When a cow has been milked for a series of years, and begins to grow old, the most advantageous mode that can be adopted, will be that of *making her dry*. To effect this purpose, a correspondent, in the 21st vol. of *Annals of Agriculture*, directs six ounces of white resin to be well pulverized, and dissolved in the evening in a quart of water; and at the same time to *house* the cow. On the following morning, she should be bled and milked, when the liquid is to be administered, and the animal turned out into the best grass. After these preparatory measures, she ought no longer to be milked, but may be fattened with any of the vegetables already pointed out, under the articles Black Cattle, Bullocks, and Cattle.

With regard to the cows intended for breeding, care should be taken to select those which give abundance of milk. For about three months previously to calving, if in the spring, they should be turned into sweet grass; or, if it happen in the winter, they ought to be well fed with the best hay. The day and night after they have calved, they should be kept in the house, and no cold, but luke-warm, water allowed for their drink. On the next day, about noon, they may be turned out, yet regularly taken in during the night, for three or four successive days; after which they may be left to themselves. Every night, the cows thus housed should be kept till the morning cold is dissipated, and a draught of warm water given them previously to their going to the field. Without this precaution, they would be apt to *slip* their calves; an accident which, independently of the loss it occasions, cannot fail to weaken them considerably. Where this is the case, and a cow begins to grow old, the most experienced farmers generally cause her to be *spayed*; and after keeping her two or three weeks from the cold, turn her into pasture. Such practice, if properly attended to, may be of considerable advantage, as the cows thus treated will thrive exceedingly, and soon be fit for sale.

Having already mentioned the advantages of *soiling* and *sweating* (see vol. i. p. 463), we shall only add here, that in the management of cows, a warm stable is highly necessary; and if they be curried in the same manner as horses, they not only receive pleasure, but will give their milk more freely. Farther, cows should always be kept clean, laid dry, and have plenty of good water to drink; in consequence of which, they will produce both more milk, and afford a quantity of rich dung, that will amply repay the trouble and attention bestowed upon them.

Cows are liable, in common with other cattle, to the Distemper (which see), and various other diseases (see Cattle), but more particularly to a stoppage, that occasions the feces to dry up in the intestine, vulgarly called *farthing-bound*; or, perhaps, with more propriety, *knit*; for, by the motion of the intestines, one of them, or part of it, is surrounded with a strong ligament, which totally impedes the passage, and adheres to the inside of the loin. Animals affected with this malady, loath their food, and frequently move their hind-legs inwardly, and up towards their bellies. The only remedy at present known is, to throw them on the ground, and make an incision in the flank, wide enough to admit the hand: thus the operator will immediately find the ligament, which must be separated with the thumb-nail; when the intestine will be released, and return to its proper position. The incision may then be sewn up; and the animal will in a short time completely recover. Although the disorder here described, is at present chiefly prevalent in the weald of Kent, and in the adjacent parts of Sussex; yet we apprehend it is not confined solely to those places, and have therefore discussed it with some attention; which may, perhaps, tend to restore to health many useful animals.

External injuries done to the udder of a cow, by blows, falls, friction, wounds inflicted with sharp or pointed instruments, by the violent sucking of calves, or the rough treatment of milkers, are frequently of serious consequence, and occasion the milk to be tainted with blood. While the inflammation continues in an indolent state, the parts affected should be anointed several times a day with fresh butter, or a salve prepared of one ounce of Castile soap dissolved in a pint and half of fresh cows-milk over a moderate fire, stirring it constantly, to form a complete mixture. But, if the udder and teats be considerably inflamed, it will be necessary to make use of internal remedies. For this purpose, take one pound of common salt, and four ounces of salt-petre, mix them carefully, and give two table-spoonfuls of the powder, every three hours, in a gallon of water mixed up with a little oatmeal.

Should, however, from neglect, the disorder have made such progress as to exhibit hard tumors, in this case fomentations, made of the following herbs, ought to be used: Take of common hemlock, or *conium maculatum*; dwarf, or small-flowered mallow, or *malva rotundifolia*; common melilot, or *trifolium melilot. offic.*; of each one handful; boil them in a sufficient quantity of water; apply them diligently, not warmer than the animal can bear it; and, as soon as a tumor opens, the sore should be properly cleansed, and then covered with a plaster of basilicon ointment, or Turner's cerate.

To promote the cure of such ulcerated parts, especially in very obstinate cases, we recommend another remedy, which has often been attended with success: Take Castile soap, gum ammoniac, gum galbanum, and extract of hemlock, one ounce of each; form them into eight bolusses, and administer one of them every morning and evening.

Lastly, to prevent cows from sucking their own milk, we are informed, that rubbing the teats frequently with the most fetid cheese that can be procured, has proved an effectual remedy.

COW-PARSNIP, or Hog-weed, the *Heracleum*, L. a native genus of plants, producing two species.

1. The *Sphondylium*, or Common Cow-parsnip, which is found in hedges, meadows and pastures. It is biennial, and bears whitish flowers, which blow in the month of July: its stalks grow from three to four feet high. In Poland and Lithuania, the peasants prepare a liquor from the leaves of this plant, which, after undergoing fermentation, is brewed, and drank instead of beer. As this beverage is perfectly harmless, it might with advantage be substituted for some kinds of ale, in which the most pernicious substances are infused, with a view to *give it a head*.—The inhabitants of Kamtschatka peel the roots, which afford a nutritious and wholesome food. An ardent spirit is also distilled by the Russians and Poles from the medullary substance of the stalks, and sometimes from the whole branches, which are first fermented in water with the great bilberries (see vol. i. p. 255), from which they obtain a liquor of considerable strength. It is more agreeable to the palate than the ardent spirits distilled from corn; though we must observe, on the authority of Dr. Böhmer, that it is a still more intoxicating and pernicious liquor than *whisky*.—Hogs, rabbits, and asses, are extremely fond of the leaves, which are also eaten by cows, goats, and sheep, but not relished by horses.

2. The *Angustifolium*, or Narrow-leaved Cow-parsnip, which is found in woods, and flowers in July. It has no peculiar properties.

Cow-Parsley, or Cow-weed. See Chervil.

Cow-quakes. See Quaking-Grass.

COWSLIP, the Common, or Paigle, or Cowslip-primrose, *Primula veris*, L. a native perennial plant, growing in meadows and pastures, on a loamy or clayey soil. It produces sweet-scented yellow-flowers, which appear in April, and are used for making cowslip-wine, or balsamic tea. Its roots have a fine odour, similar to that of anise; and give additional strength to ale or beer, when immersed in the cask. The leaves and flowers of this plant are excellent food for silk-worms, which are extremely fond of them; they are also eaten as a pot-herb, and in salads.—Cattle eagerly feed on the leaves.

COW-WHEAT, or *Melampyrum*, L. a genus of native, annual plants, comprising four species, of which the following are the principal:

1. The *arvense*, or Purple Cow-wheat, which grows in corn-fields, and is chiefly found in the county of Norfolk. It bears flowers of a yellow dusky purple, which blow in the month of July, and are succeeded by yellowish seeds. These, when ground with corn, impart a dusky, greyish cast, and a bitter flavour to the bread; but do not render it unwholesome. A decoction of the flower-spikes produces a tolerably durable blue colour, and, with the addition of the fixed vegetable alkali, a purplish red. Cronstedt, the Swedish mineralogist, obtained a fine blueish colour from the stalks alone; but none from the leaves and flowers.—The plant is eaten by cows and goats, but refused by sheep.

2. The *pratense*, or Common yellow Cow-wheat, which grows in woods and thickets, especially on clayey soils. Its blossoms are

of a deep yellow colour, with white tubes, and appear in July or August. Hogs eagerly eat the seeds, but reject the plant, which is also refused by horses. It is, however, eaten by sheep and goats, and particularly by cows, which are extremely fond of it. Where this plant abounds, the butter is yellow, and uncommonly good.

3. The *Sylvaticum*, or Wood Cow-wheat, which is very rare, being found only in some woody, shady places, in the hilly parts of Scotland. Its blossoms are entirely yellow, and flourish from June to August; but have not the white tube of the preceding species, with which it is frequently confounded. It is eaten by cows, sheep, and goats: if it be given them in abundance, they will thrive remarkably, and soon grow fat.

Cox-comb: See Yellow Rattle.

CRAB, in fruit-trees, a disease which attacks the bark, especially after transplanting them from the nursery: it destroys particularly the inner bark, by reducing it to a blackish powder, not unlike the smut in wheat.

Various conjectures have been formed, as to the origin of this formidable disorder, which is often very destructive, especially to apple and pear-trees; but none appears to us satisfactory. It is, however, very probable, that it arises from the inattention of gardeners, when transplanting young trees, so as to change their situation to a different point of the compass; for instance, by placing the northern side of the trunk towards the south; where the powerful rays of the sun parch, and in a manner burn, the tender bark. This supposition is confirmed by the circumstance, that the disease generally makes its first appearance on the south side of the bark; though, we believe, it also frequently originates from external injuries done to the tree, such as blows, scratches, &c.

The most expeditious method of relieving a tree thus affected, is that of immediately cutting out the *whole* diseased part, with a very sharp gardener's knife, and not to leave the smallest trace of its discoloration on the trunk; for an imperfect excision is attended with inevitable ruin to the tree. As soon as the operation is performed, the wounded places must be carefully covered with a plaster, made of equal parts of fresh clay, garden-mould, and cow-dung; or with the medication mentioned in our first volume, p. 432, under the article Canker.

CRAB-FISH, the Common, or *Cancer-major*, L. is a species of shell-fish, that inhabits our shores, and lurks or burrows under the sand: it is sold almost exclusively to the poorer class of people. As crabs, however, generally are in a state nearly approaching to putrefaction, before they arrive at the markets of inland towns, the eating of them is attended with considerable danger.

The *claws* of crabs form an article of the apothecaries shop. The tips or ends of them only are used; after being broken down and well washed in boiling water, they are levigated, and yield a whitish powder, which is employed as an absorbent, especially where acidity abounds in the stomach and bowels. Formerly, this preparation was much employed in diarrhœas, and especially in the Heart-burn, to which we refer.

CRAB-TREE, or *Pyrus malus*, L. is

L. is an indigenous plant, growing in woods and hedges; it flourishes better on declivities and in shady places, than in open, exposed situations, or on boggy soils. Its blossoms are white, and appear in the month of May.

This is the parent-stock, from which the numerous varieties of the apple are obtained, and on which the better sorts of them are grafted; because its roots are neither killed by frost, nor eaten by field-mice. Grass, and even corn, will grow beneath it. The wood of the crab-tree is tolerably hard, turns clean on the lathe; and, when made into cogs for wheels, acquires a polish, which renders it very durable. The acid juice of the fruit is commonly termed *verjuice*, and is much employed in recent sprains, and in other cases, as an astringent or repellent. This fruit is eaten by horses, cows, sheep, goats, and particularly by hogs, which are extremely fond of it.

Crab-trees abound especially in our forests, and their fruit furnishes abundance of food for deer, in the latter part of autumn, when grass begins to fail; and in winter they brouze on its branches, which are cut down for that purpose. As this species quickly attains its growth, it deserves to form a part of every plantation; and we have only to regret, that it is not more generally cultivated, as it will in a short time amply compensate the trouble and expence bestowed on setting it.

In dyeing, the bark of the crab-tree has been employed for extracting a yellow, and especially a citron colour: DAMBOURNEY relates, that the dry shavings of this wood imparted a fine chesnut-brown to wool prepared by a solution of bismuth.

CRAG, a species of manure, consisting of the fragments of various marine shells, which abound on the greatest part of the cliffs, contiguous to the British coast. They are often found 40 or 50 feet higher than the level of the sea, and sometimes at a considerable distance from the shore.

This kind of manure has but lately been introduced into rural economy, and is not yet sufficiently known. The husbandman, indeed, who is so fortunate as to discover it near his farm, finds a treasure of which he cannot avail himself too soon; as it will not only warm and meliorate a cold, wet, clayey soil, but also restore exhausted land, and render it equal to any, in richness and fertility.—See MANURE.

CRAKE-BERRY: See Black-berried HEATH.

CRAKE-NEEDLE: See Common Shepherd's NEEDLE.

CRANBERRY: See BILBERRY.

CRAMP, a kind of numbness, or involuntary contraction of the muscles, attended with a convulsive effort of the neck, arms, legs, &c. as likewise with a violent but transitory pain. Aged, sedentary, and infirm persons, are peculiarly liable to this complaint, for which a variety of remedies has been tried, with occasional success. Sometimes a garter applied tightly round the limb affected, will speedily remove the complaint. When it is more obstinate, a brick should be heated, wrapped in a flannel bag, and placed at the foot of the bed, against which the person troubled with the cramp may place his feet. The brick will remain warm the whole night, and thus prevent any return. No remedy, however, is equal to that of diligent and long-continued friction, which will restore the free circulation of the blood in the contracted part, while it is more simple, expeditious, and more safe in its effects.

If the cramp attack the interior organs, such as the stomach and bowels, it is always attended with danger; as frequent returns of it may terminate in death. Medicines may *relieve*, but *cannot cure*, organic affections of this nature; hence we seriously advise such patients to adopt, *betimes*, a more temperate and regular mode of life; to abstain from spirituous mixtures and *all* fermented liquors; to abandon the practice of inundating their stomach two or three times a-day with *hot* tea; to shun smoked, salted, and pickled provision of every kind, as well as fat, rancid, flatulent, and such dishes as require a vigorous digestion; in short, to avoid both the *predisposing* and *exciting* causes; the latter of which will be generally found in their own irritable temper, by indulging in fits of anger, or other depressing passion: thus, the animal fibre becomes suddenly relaxed, and again contracted, so that a paroxysm of the cramp is the inevitable consequence. On such distressing occasions, if they value a precarious life, we conjure them never to fly to the brandy-bottle, nor to take any stimulant medicines, such as laudanum, vitriolic æther, &c. which only prepare the stomach for sustaining a new attack, and accelerate the destruction of the patient. On the contrary, the mildest emollient drink, for instance, gruel, barley-water, chamomile tea, ought to be instantly procured, and small draughts of half a tea-cupful at a time be given, *luke-warm*, with 10 or 15 drops of deliquated salt of tartar in each, to be repeated every half hour, or oftener, as may be found necessary.—See CONVULSIONS and SPASMS.

CRANE, a machine used for raising large stones, and other ponderous bodies. From the numerous accidents which attend the common cranes, several skilful machinists have attempted to contrive such as would be more safe, and at the same time more easy in their operations.

The *first*, in point of time, is that invented by the late ingenious Mr. JAMES FERGUSON; which has three trundles, with different numbers of staves, that may be applied to the cogs of a horizontal wheel with an upright axle; round which is coiled the rope that draws up the weight. This wheel has 96 cogs; the largest trundle 24 staves; the next 12, and the smallest 6; so that the largest revolves 4 times for one revolution of the wheel; the next 8; and the smallest 16. A winch is occasionally fixed on the axis of either of these trundles, for turning it, in proportion to the weight intended to be drawn up. While this is raising, the ratch-teeth of a wheel slip round below a catch, that falls into them, prevents the crane from turning backwards, and detains the weight in any part of its ascent, if the man who works at the winch, should accidentally quit his hold, or wish to rest himself, before the weight is completely raised.

The *second*, is that invented by Mr. ABRAHAM ANDREWS, of Higham Ferrers, Northamptonshire. This machine weighs the body suspended, while it is raising; an improvement for which the Society for the Encouragement of Arts, &c. in 1791, granted him a premium of 15 guineas.

The proportion of the beam in the annexed plate (Fig. 1.), is as 1 to 20, the large weight being 5 pounds, and the smaller ¼ of a pound. The latter, when fixed on the beam-end, will equi-poise the former, if hung on the pulley at the end of the gib-beam, which should be placed in a right line with the crane, at the time the weight is adjusted; otherwise it will occasion a friction that may prevent the moveable beam from playing freely.

Description of Mr. A. Andrews's Crane in the annexed Engraving, Fig. 1.

The gib of the crane stands on a horizontal beam, moveable on a centre, at *A*: and the distance of the centre *A*, from the bearing of the upright, being to the distance *B*, in the proportion of 1 to 20, the weight placed at *B*, determines that of the body suspended in the same proportion.—*C* is a stub, or piece of wood, which projects from the weight hanging at the end of the gib, and serves to prevent the beam from rising to too great a height.

One of the latest improvements in this useful machine, is that proposed by the Rev. E. C. in the 2d vol. of the *Repertory of Arts and Manufactures*. It consists simply in introducing the action of a worm, that communicates the first motion to the crane, upon the axis of the wheel in which the man walks. The axis of this wheel, and that of the worm, are proposed to be in separate parts, and occasionally united by a coupling-box. When goods are to be raised, the two axes should be connected; when lowered, they may be disunited, and the worm turned by a winch. Thus, the ascent, or descent, of the weight may be accelerated, or stopped, at pleasure, by the person walking on the axis of the wheel, or turning the winch; without the remotest possibility of being overpowered by the descending weight.

Explanation of the annexed Engraving, Fig. 2.

A, The wheel in which the man walks.

B, The coupling-box.

C, The worm.

D, The wheel in which it works.

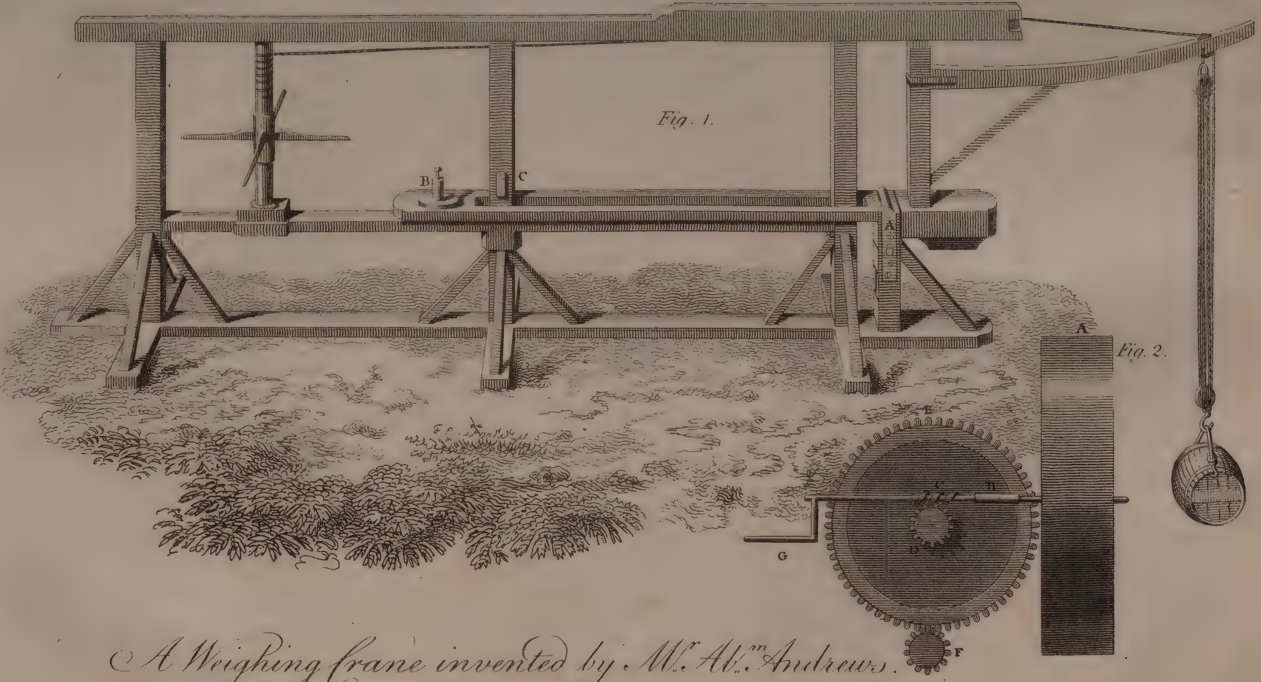
E, A wheel upon the same axis, giving motion to *F*.

F, A wheel upon the axis of the windlass.

G, The winch.

This machinery (the ingenious projector adds) may be applied to a crane already erected upon the common principle. He proposes to put a wheel on any convenient axis in the machine, in its present state; and, on this, a worm that may be thrown in or out of *gear*, at pleasure; and to let the lever, by which it is effected, lie within the reach of the man's hand in the wheel. The goods being fastened to the crane, and raised from the floor of the warehouse, in order to be let down, the man puts the worm into gear, leaves the wheel, and causes them to descend by the winch.

These contrivances are alike eminent for their ingenuity; and, though we do not venture to prefer either, yet we seriously recommend the adoption of some one of these improvements, as we are fully



A Weighing Crane invented by Mr. Abm. Andrews.

fully persuaded, that many fatal accidents may thus be easily avoided.

CRANES-BILL, or *Geranium*, L. a genus of plants comprising 145 species; of which Dr. Smith states only 13, but Dr. Withering 17, to be indigenous. None of these, however, are cultivated.

The only species reared in this country, are those brought from Africa, and other southern parts of the globe, which, from their extreme tenderness, can only be raised in green-houses. These may be propagated by the roots, but more abundantly by seed, which should be sown towards the end of March, in beds of light earth, being carefully shaded from the sun, and frequently, though gently, watered, till they are well rooted. It is, however, necessary to cover them with mats, which should be removed in mild showers, and also during the hot summer nights, that the plants may have the benefit of the dew. In the course of two months, they should be carefully transplanted into pots, about seven inches wide, and filled with light earth. They are then to be kept in a shady place, being frequently watered, till they have again taken proper roots, when it will be necessary to expose them more to the air, till the month of October, in order that they may become vigorous and hardy. As soon as the cold frosty mornings approach, they should be removed into the green-house, and placed near the window, which may be open till the cold become intense. During the winter, also, they should be occasionally watered, and their decayed leaves carefully separated. They must not, however, stand under the shade of any other plants, as their vegetation would thus be obstructed; nor will they require any artificial heat.

Cranes-bill is recommended as one of the greatest vulneraries and abstergents of the vegetable creation; and is highly extolled for its styptic power, in hemorrhages of every description. These properties have been sufficiently ascertained by experience; and it is therefore to be wished, that this plant were brought into more general esteem in the shops, where, at present, it is totally disregarded.

CRAPE, a light, transparent stuff, somewhat similar to gauze: it is made of raw silk, gummed, twisted on the mill, and woven without crossing. It is mostly used for mourning.

Crape is either *crisped* or *smooth*: the former is double, and expresses a deeper mourning; the latter single, and is worn in ordinary cases, or for more distant relations. The silk destined for the first, is more closely twisted than that for the second; as the greater or less degree of twisting, especially of the warp, produces the crisping given it, when taken out of the loom, immersed in clear water, and rubbed with a piece of wax.

Crapes are either black or white: the latter are used chiefly in the dress of young persons, or such as are devoted to celibacy. The former sort is always dyed in a raw state, that it may more deeply imbibe the colour.

CREAM, the most oily part of milk: it is specifically lighter than the other constituents, collects and floats on the surface, whence it is generally skimmed, in order to separate effectually the caseous and serous parts employed for the making of Butter and Cheese, to which we refer.

Cream is an agreeable and very nourishing article of food, when fresh; but too fat and difficult to be digested by persons of a sedentary life, or possessed of a weak stomach. It is nevertheless of considerable service in medicine, as a lenient (though palliative) application to tetters and erysipelas, which are attended with pain, and proceed from acrid humours.

A method of preserving cream: Take 12 ounces of white sugar, and dissolve them in the smallest possible quantity of water, over a moderate fire. After the solution has taken place, the sugar ought to be boiled for about two minutes in an earthen vessel; when 12 ounces of new cream should be immediately added, and the whole uniformly mixed, while hot. Let it then gradually cool, and pour it into a bottle, which must be carefully corked. If kept in a cool place, and not exposed to the air, it may be preserved in a sweet state for several weeks, and even months.

Cream of Tartar. See Tartar.

CREDIT, in commerce, a mutual trust, or loan of merchandize, or money, on the reputation of the property or solvency of a dealer.

Credit is either public or private. Every trader ought to possess some estate, stock, or portion of his own property, sufficient to carry on the traffic in which he is engaged: his dealings should also never exceed his capital, so that no disappointment in his returns may incapacitate him from supporting his credit. Yet traders of worth and judgment, may sometimes be obliged to borrow money, in order to carry on their business to the best advantage. We cannot, however, avoid observing, that the almost unlimited credit given to wholesale, as well as retail traders, is by no means a prudential, or even justifiable practice; for it not only tends to encourage the most shameful monopoly carried on, at present, with many articles, both of subsistence and convenience (for instance, those of *bread-corn* and *paper)*; but here also we may discover the prolific source of those bankruptcies which swell every Tuesday's and Saturday's Gazette.

The *public* national credit is said to *run high*, when the commodities of that nation are readily sold at a good price, and when dealers may be safely entrusted with them: also, when houses and lands meet with ready purchasers; money is borrowed at a low interest; and, lastly, when notes, mortgages, &c. will pass as currently as money.

Private credit has no accurate scale, and depends entirely on the mutual confidence of the parties. When it is extended beyond a certain length, without proper controul (as is too frequently the case with families of a certain *rank*, or *fashion)*, we may safely predict, that the following generally are its concomitant effects, viz. inferior goods, higher charges, inaccurate calculations, and law-suits, which dissolve all future connection.

CRESS, or Cresses, *Sisymbrium*, L. a genus of plants, consisting of forty-one species, eight of which are natives: the principal of these are:

1. The *Nasturtium*, or common water-cress, which is found in springs, brooks, and rivulets. It is perennial, and produces white flowers that are in bloom in June or July. The leaves have a moderately pungent taste, and penetrating smell, somewhat similar to,

though much weaker than that of mustard-seed. Water-cresses are universally used and eaten as an early and wholesome spring salad. Being an excellent antiscorbutic and stomachic, they are nearly allied to scurvy-grass, but do not possess so great a degree of acrimony. They are also supposed to purify the blood and humours, and to open visceral obstructions.

2. The *amphibium*, or Radish-Water-cress, growing in watery places, and on the banks of rivers. It is perennial, and produces yellow flowers, which blow from June to August. Its roots may be used as a substitute for common radishes. Sheep and goats do not relish this plant, and it is never touched by cows.

3. The *Sophia*, or Flix-weed Water-cress, which is found on old walls, and among rubbish. It is annual, and bears yellow flowers, in July, which are succeeded by long, stiff, crooked pods, containing yellow seeds: these remain in their capsules the whole winter, and not only support the small birds during that inclement season, but have occasionally been employed with success, as a vermifuge. The plant is eaten by cows and sheep; but is not relished either by horses, goats, or hogs.

CRICKET, an exercise or game, performed with bats and a ball. This sport was formerly confined solely to the labouring class of people, but is now becoming daily more fashionable among those, whose rank and fortune entitle their countrymen to expect a very different conduct.

Although we have, on all occasions, enjoined *proper* muscular exercise, yet we strongly reprobate that of cricket, which is in all respects too violent, and, from the positions into which players must necessarily throw themselves, cannot fail to be productive of frequent injury to the body. Indeed, we have witnessed several melancholy accidents which lately happened in our neighbourhood; and dislocations of the hip-joint, in particular, are by no means uncommon, from the aukward posture occasioned by employing *both* arms, at the same time, in striking a distant object. We trust the time is not very remote, when this game, like that of *pugilism*, will be utterly exploded by all who possess a correct taste, and have any regard for their constitution, as well as their respective situation in life.

CRICKET, the COMMON, or Hearth-cricket, *Gryllus domesticus*, L. an insect which delights in new-built houses, where the moisture and softness of the mortar enable it to penetrate between the joints of the bricks or stones, and thus to open communications to different rooms.

Crickets have a great partiality for kitchens and bakers ovens, on account of the continual warmth to be found in those places. They are known by their lively, chirping notes, performed by a sudden friction of their wings, or by striking them against their hind-legs: this noise, however, is peculiar to the males, and increases towards night, when they leave their secret haunts. The female deposits her yellowish eggs in the earth, or rubbish, whence the insects emerge in twelve days, and attain their full growth in six or eight weeks, after having four times changed their coats. Towards the latter end of the summer, they are observed to fly; a circumstance which accounts for their suddenly retreating from one place, and appearing at another.

An easy method of destroying this insect, is to place phials, half full of beer, or any other liquid, near their holes, whence they will crawl into them, and cannot escape. Cats are very fond of crickets; but the vast quantities they consume, often occasion their death. Hence it is more advisable to destroy these insects, either by pouring hot water into the holes through which they retreat, or exposing boiled peas, or carrots, mashed up with quicksilver, in places which they frequent. Another mode of exterminating them, consists in placing pea-straw near their habitations, and then immersing them into water, together with this straw, to which they are peculiarly attached.

Crime: See Punishment.

Crocus: See Saffron.

CROP, usually signifies the corn gathered off a field, in harvest.

Till the middle of last century, the best common courses of farming in Britain, consisted of a *fallow*, which, by several ploughings, broke up and cleaned the ground, but left the soil exposed to the scorching rays of the sun, during the hottest season, without any shading crop; and on this the farmer sowed *wheat*, which was succeeded by *peas* or *beans*; then followed *barley*, or *oats* (or both) on one part of the farm, for the space of ten or twenty years: the other moiety, during that time, being laid out in common pasture grasses. When any change was to be made, the part in grass was ploughed and prepared, and then thrown into the same course or rotation of crops as above: that which had been in crops, was sown with mixed grass-seeds (but not clover), to lie for ten or twenty years, as before. The whole arable part of the farm thus parcelled, included neither the homestead nor the standing meadow; so that an arable farm of 300 acres admitted of 150 being in grass lay, or old field, and 150 in crops. The fields which bore crops, were seldom equal in quantity, but in the following plan we have ventured to consider them so, for the better comparing of the *old* and *new* systems:

No. I.

Acres.		*Bushels.*
37½	fallow, naked, yields nothing.	
37½	wheat	555
37½	peas, or beans,	555
37½	barley	740
150	in crops, 4 fields	1850
150	in grass, or lay.	
300	acres.	

The fallow, wheat, and barley crops, are *exhausting*, that is, they deprive the land by exhalation of part of the vegetable nutriment deposited in it; the peas, or beans, which operate as a manure, ameliorate; but the rays of the sun on the naked soil, in the hot season, cause a considerable portion of the essence of the manure, and also of the ground, gradually to exhale.

The new system of rotation or courses of crops, was introduced about the middle of the 18th century, and is founded on the following principles, namely; 1. To *fallow*, and at the same time to have a *shading* and ameliorating mild crop growing on the fallow, while it is under the plough or hoe; 2. Never to sow any species of corn in succession; 3. To sow *clover*, or an equivalent on every field of small grain; and lastly, by means of a course of well selected crops, to prevent the soil from *resting, hardening,* and running into weeds.

By this method, entire farms are continued in a constant rotation under 4, 6, or eight divisions, or fields, in such a manner as to improve the soil, and consequently to produce a larger income.

No. II.

Acres.	*Bushels.*
60 barley - - - -	1200
60 clover - - - - -	
60 wheat - - - - -	900
60 clover - - - - -	
60 peas, or beans - -	900
	3000

300 acres, in 5 fields.

According to this new course, the wheat and barley exhaust the soil, while the clover and peas, or beans, ameliorate and improve it.

When we compare these two systems of rotations of crops, the latter is evidently the most profitable, as the 120 acres in clover are far superior to the 150 acres of common grasses on the *hide-bound* soil of the lay, or old field; and the grain and straw are more advantageous in the proportion of 300 to 185. Clover, peas, and beans (if sown in drills, and kept clean from weeds by hoeing), are inoffensive, and even ameliorating.—They all *shade* the ground during the hottest season of the year. Every kind of corn impoverishes the soil, and, if *small*, lets in weeds, which, together with *rest, bind* and *foul* the land.

The superiority of the new course of crops is still farther evinced, by a series of conclusive experiments made by Mr. A. Young. He divided 3 acres of old upland pasture into 36 squares, of 9 roods each, which he planted with beans, peas, wheat, barley, oats, cabbages, clover, potatoes, &c. in different rotations, with various success. From these comparative trials he drew the following practical inferences, which we recommend to the serious attention of our agricultural readers:

1. That potatoes exhaust the land more than any other fallow crop hitherto tried; and, in some courses, to a greater degree than barley, or even wheat.

2. That potatoes will not yield a tolerable crop, even on old lay newly broken up, without the aid of dung, and not a profitable one, even with it.

3. That barley, beans, and oats, succeed much better than wheat, after potatoes.

4. That beans are the most valuable fallow crop on new land of this quality.

5. That the preservation of the fertility of old turf depends much on the number of bean-crops introduced; as, the more frequently they are planted, the better the succeeding crops of white corn will be: and three successive years of beans are attended with an extraordinary produce of wheat.

6. That beans and barley, and beans and wheat, alternately, are both courses of great produce and advantage.

7. That the introduction of beans, in bad rotations, tends to remedy the evil of such courses.

8. That successive crops of white corn destroy that fertility, which different rotations will preserve in new ground; and that three such crops will render the land extremely foul and unprofitable.

9. That the two most productive courses are beans and barley,

alternately; the former being the most abundant, but the latter the most profitable, from the saving of tillage.

10. That four crops of beans, and one of wheat, even with the drawback of one year's cabbages, is the third course in profit; and the land will be left in such order, as to make it perhaps the first.

11. That the most unproductive, and in a still greater degree, the more unprofitable courses, are those in which turnips, cabbages, and potatoes most frequently occur.

12. That, on such new land, oats are the best white grain that can be sown, as they yield very extraordinary and valuable crops.

The same intelligent cultivator, consequently, recommends the following course, which is calculated to prove the most profitable:

1. Beans.
2. Oats.
3. Beans.
4. Oats.
5. Beans.
6. Oats.
7. Clover.
8. Beans.
9. Wheat.

The profit of beans in every rotation, by which the soil is not exhausted, is decisive; and oats are far more productive than either barley or wheat, while the old turf is decaying; because clover will revive the fertility, which beans in the 8th year will not lessen; and wheat cannot fail, after those two successive ameliorating crops, to yield a plentiful harvest. In justice to Mr. Young, we shall observe, that he proposes such a rotation only for *new* land, as there are circumstances that would render it inapplicable to other fields. For many interesting particulars, relative to this great subject, we must refer the reader to the 23d vol. of *Annals of Agriculture*, in which he will find it minutely and perspicuously treated.

CROSS-WORT, or Mugweed, *Galium cruciatum, v. Valantia, cruciata*, L. an indigenous perennial plant, growing on hedge-banks, and in meadows. It produces yellow flowers which blow from May to July, and are succeeded by seeds. A decoction of this plant in wine has been recommended as an excellent vulnerary and detergent, and is said to be of great efficacy in attenuating and expectorating tough humours.—The bones of animals, fed on the roots of the cross-wort, acquire a red tinge; and wool may be dyed of a similar colour, both by the roots and leaves.

CROUP, a violent inflammation of the throat in children under twelve years of age, prevalent chiefly on the sea-coast, in cold and wet seasons. It is attended with a peculiar croaking sound of the voice; a sense of straitness about the throat, difficult breathing, and fever.

If the croup be not speedily relieved, it obstructs the passage of the air, and suffocates the patient. Hence the legs ought to be immersed in warm water, and afterwards mustard with vinegar, or horse-radish, applied to the soles of the feet, the neck, or between the shoulders. Laxative clysters should also be administered, without delay (see Clyster, p. 14); and the child be kept cool rather than warm, and receive no other but vegetable food and diluent, slightly acidulated, drink. No medicines can with safety be given *internally*, without medical advice; but a dram of asafœtida, camphor, or a few spoonfuls of the expressed juice of garlic, may be dissolved in each injection, which should be repeated every four or six hours.

Those who are peculiarly liable

to attacks of this dangerous disease, ought to avoid all crude, hard, viscid, and heating food, especially salted and pickled provisions. Unripe fruits are particularly injurious. As an effectual preventive, Dr. BUCHAN advises a large plaster of Burgundy-pitch to be worn for several years, between the shoulders: also, constant setons or issues; of which latter, however, we by no means approve.

CROUT, SOUR CROUTE, or KROUTE, a preparation of cabbage, originally invented by the Germans, who write it, *Sauer Kraut.* For this purpose, the soundest and most solid cabbages are selected, cut very small, put into a barrel in layers, about a hand high, over each of which is strewed a handful of salt and caraway seeds: in this manner, the layers are closely rammed down, one upon another, till the barrel is full, when a loose cover is put over it, and pressed down with a heavy weight. After standing for some time, the mass begins to ferment; and as soon as it subsides, the head is fitted into the barrel, which is then finally closed, and its contents preserved for use. After being once opened, the *kraut* must be carefully compressed with a loose cover, and fresh salt and water every time substituted for that which is become foul, floats on the top, and should be removed. As this preparation has been found of considerable efficacy as an antiscorbutic, in long sea-voyages, particularly those round the world, performed by the late Captain COOK, it deserves to be more generally known in this country: and though its flavour is far from being agreeable to those who taste it for the first time, yet we are convinced from experience, that it will soon be relished, even by delicate ladies, whose reason is superior to prejudice or custom. In so damp a climate as that of Britain, we could not recommend a more antiseptic and wholesome dish, especially if it be managed with care and strict attention to cleanliness.

CROW, the Common, or Carrion-crow, *Corvus corone,* L. a bird sufficiently known: it bears a strong resemblance to the raven, both in its nourishment and other habitudes. The food of crows is carrion, or similar refuse, and also insects. They are sometimes very destructive in corn-fields, by devouring vast quantities of grain; and were formerly so numerous, and their devastations so great, as to be considered an object worthy of parliamentary redress. An act was, therefore, passed for their destruction, in the 24th of HENRY VIII. by which every hamlet was enjoined to provide crow-nets for ten years, and all the inhabitants were obliged to convene and consult, at stated times during that period, concerning the proper means of exterminating these birds. The most successful method of destroying them appears to be the following: A kind of table is to be formed between the branches of a large pollard oak; on which may be laid carrion, or any other meat, prepared with pulverized *nux vomica,* a poisonous drug brought from the East Indies. By previously accustoming the crows to resort to the place and food, without any addition, they will be induced to take it readily when thus poisoned, and consequently be destroyed. But, though crows occasionally commit depredations in corn-fields, they also devour a multitude of locusts, catterpillars, and other insects (see vol. i. p. 483). Farther, they may, in another respect, be considered as the natural planters of many trees; the kernels of which they disseminate upon the earth; and thus clearly evince that providential wisdom, which has endowed them with an instinct equally beneficial to themselves, by securing a future supply, and by rendering them conducive to the welfare of mankind.

CROW-FOOT, or *Ranunculus*, L. a genus of plants consisting of 53 species; but only 15 are indigenous, of which the following are the principal:

1. The *flammula*: See Lesser SPEARWORT.

2. The *lingua*: See Great SPEARWORT.

3. The *ficaria*, or Lesser Celandine: See PILEWORT.

4. The *auricomus*, or Sweet Wood Crow-foot, or Goldilocks, which grows in woods, groves and hedges; produces yellow flowers in April and May; and is so inoffensive that the whole plant may be eaten as spinach;—the blossoms are much frequented by bees.

5. The *sceleratus*, or round-leaved Water Crow-foot; thrives in shallow waters; and produces small yellow flowers from June to August. The whole plant is so very corrosive, that beggars are said to employ it for ulcerating their feet, which they expose in that state to excite compassion. Internally taken, this vegetable, especially the seed-bud, is extremely poisonous to man and cattle; hence it ought to be carefully extirpated from meadows. It is, however, eaten by goats; but refused by cows, horses, and sheep.

6. The *bulbosus*, or Bulbous Crow-foot, also called Butter-flower, Butter-cups, &c. It grows on meadows and pastures, produces yellow flowers in May, and turnip-shaped bulbous roots, which, like the blossoms and leaves, are so corrosive, that they speedily blister the skin: on this account they deserve, for many reasons, to be substituted for the Spanish fly.

7. The *acris*, or Upright Meadow Crow-foot: See BUTTER-CUP.

8. The *arvensis*, or Corn Crow-foot, is an annual plant growing in corn-fields; and bearing small pale yellow flowers, which blow in the month of June, and are succeded by flat prickly seeds. This noxious weed is particularly luxuriant on damp soils, and most severely exercises the patience of the farmer. The only effectual method of extirpating it is, to *fallow* the soil infested with it.—In Italy, cows, horses, and sheep, are said to eat it greedily, though it is so acrid as to poison the latter: 3 oz. of its juice killed a dog in four minutes. As it thrives chiefly in corn-fields, where cattle are excluded, its deleterious qualities are from this circumstance less known in this country. BECHSTEIN informs us, that in Germany the milk of cows becomes tinged with blood, when feeding on the fresh leaves of this plant.

CROW-NET, a contrivance that may be used in the day time, for catching wild fowl in the winter season.

This net is made of double thread, or of fine pack-thread; its meshes should be two inches wide, its length ten yards, and its breadth three; it should also be verged on the side with strong cord, and stretched out very stiffly on long poles prepared for that purpose.

When a person arrives at the place where the net is to be laid, he should open and spread it out at its full length and breadth. The lower end should next be fastened along the ground, so that it can only be moved up and down: the upper end must be extended on the long cord, the extremity of it being previously staked to the earth, by another at the distance of about five yards from the net, which must be placed in a straight line with the lower edge of the latter. The other end must be at least 25 yards distant, so as to extend to some natural or artificial shelter, by means of which a person should conceal himself from the fowl; otherwise no success can be expected. The net must, likewise, be placed in such an exact order that it may admit of being played on the birds, by the least agitation of the cord, which must be expeditiously pulled, lest the latter escape. This net may be advantageously employed for taking pigeons, crows, or other fowl, on corn-fields newly sown, as also in stubble-fields, provided the straw be long enough to hide the apparatus from the acute sight of the feathered tribe.

CRYING, the act of weeping, usually accompanied with tears; but this term is more generally applied to the squalling of infants.

It is remarkable, that the first symptoms of human life are uniformly those of loud cries: hence, superstitious persons are apt to imagine that such are the prognostics of future misery. Those who reflect upon the previous situation of the new-born, who is now surrounded by a different element, and placed in a much colder temperature, may easily account for this natural phenomenon. Instead, therefore, of being alarmed by those plaintive expressions, we ought to rejoice; because they indicate expanded lungs, and vital action. In a similar manner, judicious persons will consider the frequent and almost instinctive cries of children, as they advance in age, unless arising from accidental and obvious causes. The conduct of those mothers, who from an excess of tenderness, and of those nurses, who from too much officiousness, exert their utmost endeavours to relieve the clamorous noise of infants (often by the most absurd and pernicious means), equally deserve to be censured. Admitting that in some, nay, in many cases, it proceeds from a concealed pain, yet experience has sufficiently evinced, that these very cries alleviate, and often totally remove, such painful sensations as are produced by flatulency, gripes, &c. Nevertheless, when children continue in an uneasy state for a considerable time, violently drawing their legs towards their belly, we may conclude that they are afflicted with *colic* pains; or, if they suddenly move their hands and arms to their face, while crying, we may attribute it to difficult *teething*; and, if other morbid symptoms accompany these loud complaints, especially if repeated at certain periods of the day, we ought, in such cases, by no means to neglect them, but endeavour to ascertain the efficient causes.

Hunger is frequently assigned as a motive for *crying*, but it is not always really so; the latter is the sole language of infants, by which they manifest all their sensations and wants. If they cry without intermission, it may be considered as an indication of the return of appetite, and they ought to be satisfied either by the breast, or other means; but, if they vociferate quickly and abruptly, it may be reasonably supposed to proceed from a sense of pain. Circumstances of this nature claim the most diligent attention of mothers and nurses. We therefore earnestly enjoin them, particularly the former, to study the exact distinction of the different sounds expressed by their infants; as the result of such inquiries would greatly enable the medical assistant to ascertain, with more precision, the *true* cause of infantine diseases.

CRYSTAL, a species of stone, of various colours, of which that most generally known is the *pebble-crystal*, or *sprig* or *rock-crystal*, as it is usually called. It is common in this country, and is frequently cut into chandeliers, vases, lustres, and other ornamental articles. Even this hard and beautiful mineral has often been used in medicine, as an astringent and lithontriptic: it was formerly given in diarrhœas, and in cases of stone in the kidnies. The dose usually prescribed is from 20 to 30 grains, finely pulverized by repeatedly calcining and plunging it in cold water. It has likewise been recommended as a dentrifice, but like other hard bodies, it is apt to corrode the teeth, and consequently renders them more liable to decay.

CRYSTALLIZATION, a kind of congelation of essential, fixed, and volatile salts, which, after evaporating the greatest part of their humidity, are left to dry, concrete, and shoot into crystals.

Opaque stones, pyrites, and minerals, when regularly formed, are said to be crystallized, as well as transparent salts and stones. Ice is a true crystallization, consisting of long masses flattened on one side, and joined together in such a manner, that the smaller are inserted into the sides of the greater, making uniformly the same angle. Melted metals, and other bodies, such as wax and starch, which become solid when congealed, assume a regular arrangement, if gradually cooled.

In order to perform this process in perfection, the evaporation should be gentle, and not continued longer than till some drops of the liquor, poured on a glass plate, discover filaments of crystal. As soon as this appears, the vessel is to be immediately removed from the fire into a cooler place, and covered with a cloth, to prevent the access of cold air, which would form pellicles. From a variety of experiments, we have observed that crystallization may be remarkably promoted, by throwing into the vessel a few small crystals of the same nature.

Another method of crystallizing salts, is, by adding to a solution of salt a substance which does not act upon the latter, but which has a greater affinity with the water, and will serve to deprive the salt of a portion of that liquid which holds it in a state of solution. Spirit of wine will effect this purpose in many salts; and, if judiciously added, will cause them to separate freely from the menstruum, or fluid, and form large and beautiful crystals.

Salts have this peculiar property, that, however minutely they may be divided, when formed into crystals, they will re-assume their proper figures; so that they may, with equal facility, be divested of their saltness and their figure.—Crystallization, therefore, is one of the most important agents in chemistry, as it enables us to discover compound solutions of salts; to ascertain their purity or impurity; and, lastly, to separate different salts from each other.

CUCKOW, the COMMON, or *Cuculus canorus*, L. is a native of Africa, whence it visits this country, about the middle of April, and continues here till the end of June, or beginning of July. It is about 14 inches in length, 25 in breadth, and weighs generally about 5 ounces.

This is, perhaps, the most remarkable of the feathered tribe; as it never pairs, nor hatches its own young, but drops *one* of its eggs in the nests of different birds, especially those of the hedge-sparrow. As soon as the eggs are hatched, the young cuckow, with his broad hollow back, turns out the other eggs, as well as the young sparrows. This inimical conduct is analogous to what daily happens in human life; but it is now ascertained, that the cuckow does not ungratefully destroy its foster-parent; on the contrary, it soon leaves the nest, as its growth is uncommonly rapid, and its appetite extremely voracious, its food consisting almost entirely of animal substances, such as flies, beetles, snails, grasshoppers, catterpillars, &c. This bird may be, and frequently is, brought up tame, so as to become domesticated. In this state, it will eat bread, milk, fruit, insects, eggs, and flesh, whether dressed or raw. When fat, it is esteemed by epicures as a delicious morsel, being little inferior to the land-rail.

Although Naturalists have formed various conjectures, to account for the peculiar habit of the cuckow, in abandoning its own eggs, yet, we think, such practice is far from being as unnatural as it has been commonly stigmatized. This sagacious creature lays her eggs at intervals of six or eight days; and, therefore, instinctively deposits them in the nests of other birds, because no fowl could support itself for so many weeks, while brooding, nor would it be possible for the cuckow to maintain her voracious offspring.

CUCKOW-BREAD. See Common Wood SORREL.

CUCKOW-PINT. See WAKE ROBIN.

CUCUMBER, or *Cucumis*, L. a genus of exotic plants, consisting of fourteen species, of which the following are the principal:

1. The *sativa*, or Common Cucumber, which is reared in this country, at three different seasons of the year: 1. On hot-beds, for early fruit; 2. Beneath bell, or hand-glasses, for the middle crop; and 3. On the common ground, when designed for a late crop, or for pickling. The cucumbers gathered before April are unwholesome, on account of their being raised entirely by the heat of dung, without the aid of the sun: those growing after that month, are more salubrious, and are cultivated in the following manner: Towards the latter end of January, a quantity of fresh horse-dung should be procured, with the litter among it, to which a small portion of sea-coal ashes should be added. In the course of four or five days, the

dung begins to heat, when a little of it may be drawn flat on the outside, and covered two inches thick with good earth; over which a bell-glass ought to be placed; and, two days after, when the soil is warm, the seeds should be sown, covered with fresh mould, one-fourth of an inch thick, and the glass again set over it. This must be screened with a mat during the night, and in four days the young plants will germinate. As soon as they appear, the rest of the dung must be beaten close together into a bed for one or more lights, which should be three feet thick, and covered three inches deep with fine fresh earth; the frame is then to be put on; and, during the night, or in bad weather, sheltered with mats. When the soil is hot enough, the young plants must be removed into it, and set at two inches distance, the glasses being occasionally raised, to admit fresh air, and also frequently turned, to prevent the wet steam of the dung from dropping down on the plants. These ought to be watered at stated times, with tepid, or luke-warm water; and, as they increase in size, should be earthed up; an operation which will considerably augment their strength. If the bed be not hot enough, fresh litter should be laid round its sides; but, if it be too warm, they should be perforated with a stake, to give vent to the heat; and, as soon as the bed acquires a proper temperature, the holes are to be closed up with fresh earth. When the plants begin to shoot their third, or rough leaf, another bed should be prepared for them, similar to the first; and, when the soil is thoroughly warmed, they should be transplanted into it, in holes about a foot deep, and nine inches broad, filled with light, fine, fresh mould, laid in a hollow, circular form. In each of these holes four plants should be set, and shaded for two or three days from the heat of the sun, that they may strike root; after which time it will be useful to expose them to the sun, and the air, as often as the weather will permit. When they have attained the height of four or five inches, they should be gently fastened down to the soil, in different directions; and the branches afterwards produced, ought to be treated in a similar manner, as it will much contribute to forward their maturity. In the course of a month, the flowers will appear, and, shortly after, the rudiments of the fruit. The glasses should now be carefully covered during the night, and the plants gently sprinkled with water, in the day time. These will produce fruit till Midsummer; and may be succeeded by a second crop, which is to be raised nearly in the same manner as the earlier cucumbers; with this only difference, that the former should be sown toward the end of March, or the beginning of April, and that it requires less care and attention.

The proper season for sowing cucumbers of the last crop, or those destined for pickling, is towards the latter end of May, when the weather is settled: they should be set to the number of eight or nine, in shallow holes, and filled up with fine earth. After appearing above ground, they need only be kept clear from weeds, and occasionally watered. Five plants are to be left, at first, in each hole; and, as soon as they have grown a little larger, the worst of them is to be pulled up, so that their number

ber may be reduced to four: this crop will begin to produce fruit in July.

A very ingenious method (we learn from a Foreign Journal) of propagating cucumbers for several crops in succession, without sowing them, has been lately discovered by Mr. Burton, of Staineshead, Sussex. As soon as there appear several flower-buds on a plant, he bends the second or third joint of a branch below the blossom, fastens it firmly into the ground, and cuts off the capillary point of the plant. The new vegetable speedily takes root, when he separates it from the parent stock. Thus he proceeds with the most vigorous of his plants; and as each root has to supply only a few fruits with nourishment, he saves both room, labour, and time, while this process enables him to procure a constant succession of cucumbers for eight, twelve, and more months, from *one* sort, which is not so liable to degenerate, as if they were raised from a variety of seeds.

Cucumbers are a salubrious, cooling fruit, and may be safely allowed to consumptive patients; as they sweeten acrid humours, and at the same time are gently laxative; but, being in a considerable degree acescent, and sometimes attended with flatulency and diarrhœa, such effects may be prevented, by eating them in great moderation; or with the addition of vinegar and pepper, which counteract their natural coldness. If properly pickled (without colouring them with that poisonous metal, copper; or rendering them too acrid with stimulant spices), they are an excellent antiseptic; yet we consider them highly improper, either for children or wet-nurses.

2. The *Colocynthis*, Coloquintida, or Bitter Apple, which grows in Syria, and also in the island of Crete. It produces a yellow fruit, of the size of an orange, and resembling a gourd, the shell or outside of which contains a very light, white, spongy pulp, interspersed with flattish seeds. This pulp, when dried and pulverized, is one of the most violent purgatives: and though it is frequently employed for that purpose, we cannot but caution the reader against its use, which is sometimes attended with bloody stools, colics, convulsions, and ulcers in the bowels. As we are possessed of numerous native plants of similar and much milder virtues, there appears to be no necessity for employing this exotic.

Cudbear: See Orchal.

CUDWEED, or *Gnaphalium*, L. a genus of plants, comprising 72 species, of which the following are the principal:

1. The *Germanicum*, or Common Cudweed, an annual indigenous plant, which grows in barren meadows, pastures, and road-sides; and produces yellowish flowers, which blow in the month of July or August.—This plant is desiccative, and astringent; it is said to be of great service in dysenteries and hemorrhages of every kind. A decoction of it in small beer, is frequently given by the lower class of people for quinsies, in the cure of which complaint it has been found very efficacious.

2. The *Dioicum*, or Mountain Cudweed, or Catsfoot, grows on dry mountainous pastures in the North of England, Wales, and Cornwall; also on the Newmarket,

Canham, Swaffham, and Stratton heaths, &c. Its white and purplish flowers blow in June and July. The late Dr. GLEDITSCH enumerates it among those plants, which he found useful in currying leather.

3. The *Arenarium*, or Sandy Cudweed, a native of Germany, which grows on sandy fields and banks; and produces fine yellow flowers through the whole summer. It deserves to be propagated in Britain, as the Japanese, according to Prof. THUNBERG, occasionally prepare their *moxa* from the down with which the whole plant is covered, and smoke its leaves for common tobacco.

CURB, a chain of iron fastened to the lower part of the branches of the bridle, in a hole called the *eye*, and running over the horse's chin or beard. It consists of three parts; namely, the hook fixed to the eye of the branch; a chain of links; and two rings or mailes.—Large round curbs are the best and most easy; but due care should be taken to fix them in their proper place, a little above the beard, and neither too tight nor too slack, otherwise the bit will be of little utility.

CURB, in farriery, is a hard, callous swelling on the hinder part of the hock, attended with stiffness, and sometimes with lameness. It generally arises from hard-riding, strains, blows, or kicks; and may at first be easily cured, by three or four times blistering the animal affected. If the tumor continue to indurate, the most expeditious and effectual cure will be, to *fire* with a thin iron, drawing several deep lines down the middle from the top to the bottom, and then to apply a mild blistering plaster, which will certainly remove the defect.

CURDLING, the coagulation of any particular fluid, such as milk. In Tuscany, it is effected by means of artichoke flowers, instead of the rennet employed in Britain. There are, besides, a variety of substances which may be advantageously substitued for either, especially when the whey is intended to be a cooling and antiseptic beverage; for instance, a small quantity of cream of tartar; a few drops of oil of vitriol, or spirit of salt, previously diluted in a spoonful of water, will easily coagulate the milk; after which it should be strained.—See CHEESE.

CURING, a term used for preserving fish, flesh, and other animal substances, by adding certain ingredients, to prevent putrefaction. It is also effected by drying the bodies with the smoke of wood, or by rubbing them with salt, nitre, &c. See BEEF, and PRESERVATION.

CURL in potatoes. See POTATOES.

CURLEW, or *Scolopax arquata*, L. an aquatic bird, large flocks of which visit the sea-coasts and marshes, feeding on shells, frogs, crabs, and other marine insects.—In summer, they retire to the mountainous and unfrequented parts of the country, where they pair and breed.

Curlews differ much in weight and size, some weighing 37 ounces, others not 22; the largest seldom exceed 25 inches in length, and are generally from 3 to 4 feet broad, with their wings expanded. Their flesh is extremely rank and fishy, though some have highly commended it for its flavour and delicacy.

CURRANT-TREE, or *Ribes*, L. is an indigenous plant, comprising 6 or 7 species, of which the following are the principal:

1. The *Rubrum*, or common Red Currant, which is found in woods in the northern counties. It bears greenish white flowers, which blow in the month of May, and are succeeded by red berries. Its leaves are eaten by cows, goats, and sheep, but with reluctance by horses.—This plant is very liable to be infested by a species of plant-louse, the *Aphis ribes*, the depredations of which change the fine green colour of the leaves, that become red, pitted, and shrivelled. The best method of exterminating these vermin is, by smoking the bushes with half-burnt wood, or sprinkling them early with decoctions of tobacco, or solutions of lime and pot-ash, or simple soap-water.

2. The *Alpinum*, or Sweet Mountain Currant, which grows wild chiefly in the county of York, and flowers in the month of May. Its fruit has a flat sweetish taste, and is only relished by children. The wood is so hard and tough, that it makes strong teeth for rakes; the leaves are eaten by sheep, goats, and horses.

3. The *Nigrum*, or Black Currant, which has woolly flowers that blow in the month of May.—Its leaves are eaten by goats and horses.

The different species of currants will thrive on almost any soil; but their fruit is more savoury, when produced in a dry and open ground. They are very easily propagated, by planting slips, or cuttings, at any time from September to March, upon fresh earth, which should be carefully cleared from all weeds during the spring; and, in dry weather, the young plants ought to be frequently watered. After standing about two years, they will be fit to be removed to those places where they are intended to remain; an operation which should be performed when the leaves are just decayed, so that the plants may have time to strike root before the winter-frosts. If they are designed for *standards*, they should be planted in rows 8 or 10 feet apart, and the trees in each row 4 feet distant from each other; but the more eligible way is to train them in espaliers, where they take up less room, and their fruit acquires a finer flavour. In this state, they should be placed from 6 to 8 feet apart, and all their branches trained horizontally: the same distance is also to be allowed them, when set against walls or pales.

The fruit of the *red* and *white* currants is greatly esteemed for the table. They are nutritive, but should not be too frequently nor abundantly eaten, as they tend to produce flatulency, in persons of relaxed habits and a sedentary life: hence they ought to be consumed together with other food, in which case they are emollient, gently laxative, and, in some instances, anodyne. In fevers, the juice of currants, when mixed with an equal quantity of sugar, and made into a jelly, is cooling and grateful to the stomach; being in a slight degree astringent and antiseptic.

Currant-Wine is an excellent drink during the heat of summer, especially with the addition of water. Different receipts have been given for making this pleasant beverage. We select the following: Gather the currants when they are fully ripe; break them into a tub, or vat; then press and measure the juice, to which add two-thirds of water, and to each gallon of that mixture put 3lbs. of soft sugar; agitate the whole properly till the sugar is dissolved, when it may be barrelled. The juice should not be left to stand during the night, as the fermentation ought not to take place, till all the ingredients are compounded.

Black Currants have a peculiar flavour, which many persons dislike: they are, however, reputed to be very wholesome, and their juice is frequently boiled down into an extract or syrup, with the addition of a small quantity of sugar; in which state it is called *rob*, and much esteemed in sore-throats and quinsies. Some persons put black currants into brandy, for the same purpose as others do cherries; compositions that are less adapted to the benefit of health, than to stimulate the corrupted palate of dram-drinkers. An infusion of the young roots of the former, is said to be useful in eruptive fevers of the human species; and in those dysenteric distempers with which cattle are sometimes affected.

CURRYING, the art of dressing cow-hides, calves-skins, &c. The principal object in this process, is to soften and supple cow and calf skins, which are usually employed in making upper-leathers and quarters of shoes, the covers of saddles, coaches, &c. As soon as these skins are brought from the tanner's yard, the currier first soaks them for some time in common water, when he takes them out, stretches them on a smooth wooden horse, scrapes off with a *paring-knife* all the superfluous flesh, and immerses them again. They are next put on a wet hurdle, and trampled with the heels, till they become soft and pliant, when they are steeped in train-oil, and afterwards spread out on large tables, and their ends tightly secured. There, by means of a *pummel* (an instrument consisting of a thick piece of wood, the lower side of which is full of furrows, or teeth, crossing each other), the currier folds, squares, and moves the skins in various directions, to render them supple. This operation is properly called *currying*; and, with a few immaterial exceptions, is that now generally followed.

After the skins are thus dressed, they are coloured, black, white, red, green, &c. which process is performed either on the *flesh* or *grain* side; that on the former, by skinners, and that on the *grain* or *hair* side, by curriers: these, when a skin is to be made white, rub it with chalk, or white-lead, and afterwards with pumice-stone. But, when a black colour is wanted, the skin must be first oiled and dried, then passed over a puff, dipped in water impregnated with iron, when it is immersed in another water prepared with soot, vinegar, and gum-arabic. Thus it gradually acquires a deep dye, and the operations are repeated till it becomes of a shining black. The grain and wrinkles, which contribute to the pliancy of calves and cows leather, are made by the reiterated folds given to the skin in every direction, and by the great care taken to scrape off every excrescence and hard place on the grain, or colour-side.—See COMFREY and TANNING.

CURRYING, a manual operation performed on horses, with an instrument called a *curry-comb*; it may also be applied to cows, and indeed to all black cattle, that are much confined to the stall or yard, especially during the winter. Independently of the circumstance, that so useful a practice essentially contributes to the health and *kindliness* of animals, it also in a remarkable degree promotes their thriving and becoming fat.—See BULLOCKS, vol. i. p. 390.

CUTTINGS, or slips in gardening, are those branches or sprigs of trees, which are cut or slipped off, in order to be transplanted; an operation that may be effected in any moist, fine earth. The most proper seasons for this purpose are the months of September, October, March, and April; but great care ought to be taken that the sap be not too abundant in the top, lest the *cut* decay, before that part which is in the ground, has taken sufficient root to support it; nor should it be too dry or scanty, as the sap in the branches promotes the growth of the root, especially if it be not planted too deep: See TRANSPLANTATION.

In selecting the cuttings, those branches which have joints, knots or burrs, ought to be cut off two or three inches below the latter, and the leaves stripped so far as they are set in the earth. Small top-branches, of two or three years growth, are the most proper for this purpose.

CUTTLE-FISH, or *Sepia*, L. a remarkable genus of the finny tribe: the bones of a particular species, called the Officinal Cuttle, are frequently thrown out by the sea on the British shore, but the fish itself very rarely.

This curious fish, when frightened or pursued, emits a black liquor, which is supposed to have been used by the ancients, instead of writing-ink. It was also esteemed by them as a delicacy, but at present is relished only by the Italians. Its porous and laminated bones were formerly employed in medicine as an absorbent; and are still kept in the druggist-shops. They are hard on one side, but soft and yielding on the other, so that very neat impressions from medals, &c. may be easily made upon them, and then serve as moulds for casting metallic figures representing the original. These bones, in a calcined state, are farther useful, not only for cleaning and polishing silver, but chiefly for absorbing the acidity and tartness of wines, which, if not completely spoiled, may thus be restored to their former briskness.

CYDER, or CIDER, a sharp, cool, and vinous beverage, made by fermenting the juice of apples. Some connoisseurs in this liquor are of opinion, that the juice of the more delicate table-fruit is generally more cordial and pleasant than that of the wild or harsh kinds; though others assert the latter to be in many respects preferable.

The apples should remain on the tree till they are thoroughly ripe, when they ought to be gathered with the hand in dry weather, that they may be protected both from bruises and from moisture. They are then to be sorted, according to their various degrees of maturity, and laid in separate heaps, in order to *sweat*; in consequence of which they greatly improve.—This practice, however, appears to be useful only for such fruit as is not perfectly ripe, though some recommend it as being proper for *all* apples. The duration of the time of sweating may be determined by the flavour of the fruit, as different kinds require various lengths of time; namely, from eight or ten days to six weeks. The harsher and more crude the apples are, the longer it is necessary that they should remain in a sweating state, and not only be well dried, but the rotten parts carefully pared, before they are exposed.

The utility of the sweating practice is acknowledged in all the cyder countries, though various methods have been adopted in following it; as the apples are piled up either in the open air, or under cover in houses. In the South-hams, a middle way has been adopted, to avoid the fermentation occasioned by piling them up in rooms, and which we recommend as the best, and most rational. Heaps of fruit are raised in an open part of the orchard, where, by means of a free air and less heat, the desired maturity is gradually effected, with an inconsiderable waste of the juice and decay of the fruit, which thus becomes almost totally divested of rancidity. And though a few apples will rot even in this manner, they are still fit for use: all of them continue plump and full of juice, and heighten in a considerable degree the colour of the liquor, without imparting to it any disagreeable smell or taste.

The fruit is then to be ground till the rind and kernels are well bruised; a process which will considerably improve the flavour and strength of the liquor, when it should be allowed to stand for a day or two, in a large open vessel. It is next pressed between several hair-cloths, and the liquor received in a vat, whence it is removed into casks, which ought to be placed in a cool situation, or in the free air, with their bung-holes open. These casks are to be sedulously watched, till the cyder *drops fine*, when it is to be immediately *racked off* from the lees into other vessels. The first *racking* is a most important operation; as cyder, which is suffered to become foul again, by missing the first opportunity of racking it when fine, will never become what is called a *prime* liquor. After the clear part has been racked off, a quantity of lees or dregs remains, which, when filtered through coarse linen bags, yields a bright, strong, but extremely flat liquid: if this be added to the former portion, it will greatly contribute to prevent fermentation, an excess of which will make the cyder thin and acid. To avoid such an accident, the casks should neither be entirely filled, nor stopped down too close; and, if the whole incline to ferment, it ought again to be racked. This latter operation, however, should on no account be repeated, unless from absolute necessity; as every *racking* diminishes its strength.

When there are no signs of any farther fermentation, the casks should be filled up with cyder of the best quality, and the bung-hole firmly closed with resin.

This method of making cyder is that chiefly followed in Herefordshire. Considerable quantities of this liquor are also made in Devonshire, where the process varies but little from that pursued in the county before-mentioned. Several farmers, however, instead of racking, *fine* it with isinglass, steeped in white-wine, dissolved over the fire, and then boiled in a quantity of the liquor intended to be fined: in this state, it is added to that in the cask. Others, instead of dissolving the isinglass over the fire, digest it in white wine for the space of four or five weeks; during which time it acquires the consistence of a jelly; a quantity of this being beaten up with some of the liquor, the whole is worked into a froth, and mingled with the rest. As soon as the cyder becomes clear, it is drawn, or bottled off, as occasion may require.

Those who are anxious to prepare good cyder, ought diligently to watch every change of the weather, however slight; as the least neglect, at such times, is often detrimental to many hogsheads. In summer, the danger is much greater than in winter. There is, however, scarcely any distemper incident to this liquor, which may not, by a timely application, be easily remedied. If it become somewhat tart, about half a peck of good wheat, boiled and hulled in a manner similar to rice, may be put into each hogshead, which will effectually restore it; and also contribute to preserve it, when drawn out of one cask into another. Such a remedy is doubtless far preferable to that odious custom practised by too many cyder merchants, who put animal substances into their liquors, namely, veal, pork, beef, mutton, and even horse-flesh, for the purpose of fining them. This singular expedient, though sanctioned by the usage of ancestors, we think it our duty to reprobate; because it is fraught with mischievous effects on the constitution of those, who are doomed to drink the cyder thus adulterated. By allowing a small quantity to stand in an open vessel for two or three days in a warm room, the fetid exhalation of the liquor will easily discover its ingredients.

The best cyder is that made from a red-streak apple, grafted upon a gennet-moil stock. These two varieties of the apple-tree agree well together, and their trunks seldom canker, as others are apt to do, especially when the former is grafted on crab-trees. The fruit of the red-streak obtained from the former combination, is always larger and milder; and, when ripe, not only most delicious eating, but also affords a mellower liquor than the same fruit produced by the latter mixture.

Many estates, where the soil is not proper for corn, might be greatly improved in value, by cultivating the different sorts of apples that are used in making cyder, which finds at all times a ready market, and requires no fuel in brewing it; besides that the labour occurs only once every year. The greater the quantities of cyder made together, the better it usually succeeds; but it will be necessary that the vessels in which the liquor is to be kept, be capacious and well seasoned. In this case, it will not only remain sound for a great number of years, but also progressively improve.

An ingenious *Treatise on Cyder*, in 4to., was published about the year 1754, in which the reader will find several pertinent instructions relative to this subject.

By the 27th Geo. III. c. 13, every hogshead of cyder or perry, made and sold by retail, pays a duty of 14s. 7d. to which are to be added 4s. imposed by the annual malt-acts, the whole amounting to 18s. and 7d.—For every hogshead, made and sold in quantities of 20 gallons, or upwards, by any dealer or retailer, from fruit of his own growth, 6s. 11d.; and for every hogshead of such last mentioned cyder or perry, received into the possession of any person, to be sold by him, 7s. 8d. are to be paid: the total of these duties, after adding the annual one of 4s., will amount to 18s. 7d.—For every hogshead made in Great Britain, and sent or consigned to any factor or agent, who shall receive it for sale, to be paid by such factor 19s. 2d.; but, if the latter have paid the annual malt-duty of 4s., this sum is to be deducted from the 19s. 2d., no cyder or perry being chargeable with a higher duty than 19s. and 2d.—All these duties are payable to the *Excise*, and are drawn back on exportation; 3d. per ton being allowed.

Cyder is a cooling, pleasant, and wholesome liquor during the heat of summer, if it has been prepared without foreign ingredients, and properly fermented. On the contrary, when it is too new, or tart, or has perhaps been kept in leaden vessels; or the apples and pears have, after grinding them, passed through leaden tubes, we can by no means recommend it as a salubrious beverage; because that poisonous metal is easily dissolved by the acid, and thus gradually introduced into the body. However agreeably such cyder, or perry, may stimulate the palate, it cannot fail, sooner or later, to produce painful and dangerous colics, as it not unfrequently generates the most desperate and incurable obstipations, among those who accustom themselves to the free use of these liquors.

Cyderkin, Purre, or Perkin, is a liquor made of the *murk*, or lees remaining after the cyder is pressed: these are put into a large vat, with half the quantity of cold water, which has been previously boiled: if that proportion be exceeded, the cyderkin will be *small*. The whole is left to digest for 48 hours, when it should be well expressed: the liquor thus obtained is to be immediately barrelled, and closely stopped; it will be fit for use in a few days.

Cyderkin easily clarifies, and is used in many families instead of small beer: if boiled after pressure, with a proper quantity of hops, it may be kept for any length of time.

Cyder-Spirit, an ardent liquor, drawn from cyder by distillation, in the same manner as brandy is from wine. The flavour peculiar to this spirit is by no means agreeable; but it may, with care, be totally divested of it (see Charcoal, vol. i. pp. 492 and 493), and become an excellent substitute for those deleterious preparations, sold under the name of spirituous compounds and cordials. Wholesale-dealers have lately availed themselves of this liquor, and, after imparting to it various flavours, they vend it as a substitute for others, but especially by mixing large quantities of it with foreign brandy, rum, and arrack, without the remotest apprehension of such fraud being detected.

Cyder-Wine is a liquor made by boiling the fresh juice of apples: after being kept three or four years, it is said to acquire the flavour and colour of Rhenish wine. The method of preparing it consists in evaporating the juice in a brewing-copper, till one half be dissipated; the remainder is then immediately conveyed to a wooden cooler, whence it is barrelled, with the addition of a due proportion of yeast, and fermented in the usual manner.

This American process has of late years been imitated in the cyder-countries, and particularly in the West of England, where several hundred hogsheads of cyder-wine are annually prepared; and being supposed to contain no particles of copper from the vessels in which it is boiled, the country people consider it as perfectly wholesome, and accordingly drink it without apprehension. In order to ascertain the truth, various experiments were instituted by the late Dr. FOTHERGILL; from the result of which he proved, that cyder-wine *does* contain a minute portion of copper, which, though not very considerable, is sufficient to caution the public against a liquor, that "comes in so very questionable a shape."

Independently, however, of the danger arising from any metallic impregnation, we doubt whether the process of preparing boiled wines be useful, or reconcileable to economy. The evaporation of the apple-juice, by long boiling, not only occasions an unnecessary consumption of fuel, but also volatilizes the most essential particles, without which the liquor cannot undergo a complete fermentation, so that there can be no perfect wine. Hence this liquor is, like all other *boiled* wines, crude, heavy, and flat: it generally causes indigestion, flatulency, and diarrhœa. Those amateurs, however, who are determined to prepare it, ought at least to banish all brass and copper vessels, from this as well as from every other culinary process.

CYPER-GRASS, or *Cyperus*, L. a genus of plants producing seventy-nine species, of which the following are the principal:

1. The *rotundus*, or Round Cyperus, a native of the East Indies: its imported root is knotty, surrounded with tough, fibrous strings, of a brown colour externally, but grey internally; and of a pleasant odour, especially when fresh and well dried.

2. The *esculentus*, or Eatable Cyperus (earth-almonds), growing wild in the East, in Italy, and the South of France. Its pulpy and mealy root is agreeably sweet, not unlike chesnuts, and might be advantageously cultivated in this country, as an occasional substitute for bread.

3. The *papyrus*, or Paper-Cyperus, a native of Calabria, Sicily, Syria, and especially of Egypt, on the banks of the Nile. From this noble plant, the ancients manufactured most of their *paper*, their sail-cloth, mattresses, ropes, nay, even their apparel. Perhaps, we may soon be enabled to import an abundant supply of this valuable vegetable, in British vessels.

4. The *longus*, or Sweet Cyperus, or English Galingale, a native plant, which is chiefly found on the isle of Purbeck, where it flowers in July. Its root is of the size of an olive, full of little knots or specks, of an oblong figure and grey colour; of a warm, somewhat bitter taste; and almost destitute of smell, when newly taken out of the ground.

In medicine, the roots of the first, or round cyperus, as well as those of the English galingale, are esteemed cordial, diuretic, and cephalic; they occasionally have afforded relief in nephritic disorders,

ders, as also in colics; and may be taken either in powders, or in a decoction. The production of the latter, or native species, however, is at present seldom used; though we presume it is in no respect inferior to some of the more costly medicines imported into this country.

CYPHEL. See Common HOUSE-LEEK.

CYPRESS, the COMMON, or *Cupressus sempervirens*, L. is a native of the islands of Candia and Crete, but may be easily propagated in Britain, from seeds as well as cuttings. The proper season for sowing the former, is the month of March, when the ground should be dug, well broken, raked smooth, and an inch of the earth drawn evenly off the surface into an alley: the seeds should then be scattered moderately thick, and the soil sifted immediately over them, half an inch deep. During the summer, they should be kept clear of weeds, and, in dry weather, gently watered: in winter, they must be occasionally sheltered from the frost, with mats; and, in the course of two years, they will be fit for transplanting, when they should be set in nursery-rows, two feet asunder; and, in three or four years, they may be removed to the shrubbery.

The cypress-tree, though found in most of our old gardens, is at present much neglected: it deserves, however, to be more diligently cultivated, as it not only adds considerable beauty to wildernesses and groves, but also affords a valuable wood, which is aromatic, very compact, and heavy; is neither liable to decay or putrify, nor to the devastations of the worm, so that it is admirably calculated for chests, drawers, musical instruments, and other utensils.

This tree is eminently recommended for purifying the air, and for the benefit of weak lungs: hence, the ancient physicians sent their consumptive patients to the island of Crete, where the cypress is very abundant. Its nut, or fruit, is a very powerful astringent and balsamic, and is, perhaps, inferior to none of the simples employed in diarrhœas and dysenteries.

D

DAB, or *Pleuronectes limanda*, L. a fish that frequents the English seas, where it is caught in considerable numbers. It is, in general, of an uniform brown colour, on the upper side, though sometimes of a darker shade. The scales are small and rough, and the lower part of the body is white. These fish are in season from February to April: they spawn in May and June, and become watery and flabby during the remainder of the summer. They are flat; and, though inferior in size to the common plaise, the dab is preferred in point of delicacy and flavour.

DACE, or *Leuciscus cyprinus*, L. a fish found in most of the still, deep rivers of this country, where it is very prolific. It seldom exceeds 10 inches in length, or weighs more than a pound and a half.

Dace spawn in the month of

February, and are in the highest perfection in April and May; but they are at no season a well-tasted fish, or much esteemed. They afford, however, considerable amusement to the expert angler, as they will bite at any fly, but are particularly fond of the stone-caddis, or May-fly, which abounds towards the latter end of April, and the whole of May. After that month, recourse must be had to the ant-fly, the best of which are those black insects found in large ant or mole-hills. In warm weather, these fish seldom refuse a fly on the surface of the water; but, at other times, the bait should be immersed to within three inches of the bottom. The winter angling for dace requires a very different bait: this is a white maggot with a red head, being the produce of the eggs of the beetle, and which is turned up by the plough in great abundance. A number of such grubs, if kept in any vessel with the soil in which they were taken, may be preserved for several months, and will prove an excellent bait.—Small dace may be put into a glass jar with fresh water, which should be frequently changed: in this element, they live a long time, and gradually become tame.

DAFFODIL, the COMMON, or *Narcissus pseudo-narcissus*, L. an indigenous, perennial plant, growing in woods, meadows, and the sides of hedges, which is found chiefly in the north and west of England. It produces large yellow, ill-scented flowers, which appear in March.—BECHSTEIN observes, that two drams of the root afford a gentle laxative.

DAIRY-HOUSE, in rural economy, a place appropriated to the management of milk, butter, cheese, &c.—See MILK, BUTTER, CHEESE, CHURN, and COWS.

A dairy ought to be so situated, that the windows, or lattices, may never front the south, south-east, or south-west; and it should at all times be kept in the neatest order. Lattices are also far preferable to glazed lights, as they admit a free circulation of the air. It has, however, been objected, that the former afford access to the cold air of winter, and to the sun in summer; but either may be easily remedied, by making the frame somewhat larger than the lattice, and constructing it so as to slide backward and forward at pleasure. Across this frame, packthread may be stretched, and oiled paper pasted on it, which will thus admit the light, and effectually keep out the sun and wind.

During the summer, dairy-houses cannot be kept too cool: they ought therefore to be erected, if possible, near a cold spring, or running water; and, where it is practicable to conduct a small stream through the premises, it will much contribute to the convenience and utility of the place.—Dr. ANDERSON observes, in his practical essay on the management of the dairy (published in the 3d and 4th vols. of his ingenious "*Recreations in Agriculture*," &c.) that, if the water can be introduced by means of a pipe, so as to fall from some height on the floor, it will be productive of many advantages, particularly by preserving a continual freshness, and purity of the air. Dairy-houses should therefore be neatly paved, either with red brick, or smooth hard stone, and laid with a proper descent, so that no water may stagnate. This pavement should be well washed every day during the summer; and all the utensils, here employed, be kept with unremitting attention to cleanliness. Nor should the churns be at any time scalded in the dairy; as the steam arising from hot water, tends greatly to injure the milk. For similar reasons, neither the cheese and rennet, nor the cheese-press, must be suffered to taint the atmosphere; as the whey and curd will diffuse their acidity over the whole building.

All the utensils of the dairy should be made of wood, in preference either to lead, copper, or cast-iron; for these metals are easily soluble in acids; the solutions of the two first are in a high degree poisonous; and, though the latter is in itself harmless, the taste of it renders the productions of the dairy very disagreeable. The cream-dishes, when perfectly clean and cool, ought to be filled with the milk, as soon as it is drawn from the cow, and has been carefully strained through a cloth, or cloth-sieve made of hair or silver-wire; the latter of which, as Dr. ANDERSON justly remarks, is more wholesome than those of other metals. These dishes should never exceed three inches in depth, but may be so wide as to contain a gallon, or a gallon and a half of milk:—when filled, they ought to be placed on shelves, to remain there till the cream be completely separated. Now it is to be taken off with nicety, by a skimming-dish (without lifting or removing the milk, or shedding any of it on the floor, which would soon corrupt the air of the room), and then deposited in a separate vessel, till a proper quantity be collected for churning. A firm, neat wooden barrel, which is open at one end, and has a lid closely fitted to it, appears to be well calculated for this purpose; a cock or spigot, ought also to be fixed near the bottom, to draw off the thin, or serous part, that may drain from the cream; and the inner side of the opening should be covered with a piece of fine silver wire-gauze, in order to prevent the latter from escaping, while the former is allowed to pass.

But, if notwithstanding the fatal consequences arising from the use of metallic utensils, or of earthen vessels glazed with lead, farmers still persist in employing them, it ought to be a constant and indispensable rule, to scald and scour them properly with salt and water, every day, and to dry them thoroughly, before the milk is deposited in them. Lastly, it is sincerely to be wished, that all the utensils employed in the dairy, of whatever materials they may consist, should be cleaned with similar care, previously to their being used; and, as long as the least acid smell is perceptible, they ought to undergo repeated scourings, till they are completely sweetened.—See MILK-HOUSE.

DAISY, the COMMON, or *Bellis perennis*, L. a perennial, indigenous plant, which abounds in meadows and pastures, and is in flower from March to September.

The leaves of the daisy, though slightly acrid, may be eaten as early spring-salad, or boiled like spinach; its roots have a pungent taste, and are in high repute abroad as an excellent vulnerary, attenuant, cooling and astringent medicine: yet no attention is paid to it in this country, except what it claims from the beauty of its flowers; on account of which it has been introduced into gardens.

It is refused by horses, sheep, and cows.

M. BECHSTEIN, a respectable German naturalist, mentions a curious fact relative to the virtues of the common daisy. In the 2d vol. of his *Concise Natural History of Plants, both foreign and indigenous* (printed at Leipzig in 1797), he says in a note—" I am acquainted with a very skilful and experienced physician, who has completely cured several consumptive persons with the *flower-buds* of the *bellis perennis*, by stuffing young chickens with these buds, without any other ingredients; then stewing them in unsalted beef-tea or broth, adding a little fresh butter, and allowing the patient for three weeks no other food but the medicated dishes thus prepared. At first, it affords a delicious repast."—We candidly confess, we have had no opportunities of ascertaining the efficacy of this preparation, by the test of experience; but nevertheless we believe, that in so desperate a situation as that of *pulmonary consumption*, or other species of *atrophy* (unattended with violent febrile symptoms), it well deserves to be opportunely and fairly tried.

DAMASCUS-Steel. See STEEL.

DAME-WORT, or DAME'S VIOLET, the *Scentless*, or *Hesperis inodora*, L. is an indigenous perennial plant, which grows in pastures and hedges, and flowers in the month of May or June. According to BOERHAAVE, it is antiscorbutic and diaphoretic, and of great service in asthmas, coughs, and convulsions. It has also been recommended, externally, in inflammations, cancers, gangrenes, and in contagious disorders.

DAMP. See LINEN.

DANCING is the art of moving the body, agreeably to certain rules, and adjusted to the measures of music, either sung or played. It is generally the effect or indication of joy among most nations; though there are tribes in South America who *dance* to shew their sorrow; and it also formed a part of the funeral solemnities of the ancients.

In the heavy days of autumn and winter, when the atmosphere is loaded with humid particles, when a sedentary life disposes the human body to hypochondriacal affections, *dancing* is an admirable amusement. Independently of the beneficial effects which music and a cheerful company display on a susceptible mind, *moderate* dances possess every advantage of gentle exercise. But those maniacal turnings and gesticulations, which have lately become fashionable in this country, under the appellation of *German Vaults* (or rather *Walzen, i. e.* performing a circular motion, like that of a man on the eve of intoxication), are attended with very different effects. It would be superfluous to enumerate the pernicious consequences resulting from that frantic inclination to distort the human frame: we may confidently assert, that *Walzen* is at present almost universally exploded in the cultivated circles of society among the Germans, who consider it as a dangerous and *vulgar* dance. In confirmation of this statement, we meet with a treatise, expressly published, *On the Moral and Physical Consequences of Dancing*; addressed to the guardians of youth, by Dr. SPONITZER (Berlin, 1795); an enlightened physician, whose satire and judgment are equally conspicuous.

Violent dancing, especially in the

heated atmoshpere of a crowded assembly, produces a temporary fever, even in the bye-standers, who inspire an air exceedingly vitiated by the breath of persons apparently in a semi-delirious trance, and by the suffocating vapour of candles. The blood is unnaturally propelled to the breast and head—hence arise frequent colds, coughs, and periodical head-achs; perspiration is wantonly checked; the lungs are forcibly expanded, and the foundation is laid for that avenging disease, *consumption*, which spares neither rank, age, nor sex, and often exterminates whole families.

On the other hand, we do not presume to discourage the shorter and less fatiguing dances, such as minuets and poloigneses, which are not only modest and becoming, but contribute to the graceful form and motion of the body. Every provident parent, who feels the value of sound and healthy children, will readily concur with us in opinion, that so precarious a public amusement ought to be regulated by the State, or at least controlled by the superior sense of the aged; and not to be absolutely intrusted to the choice or caprice of youth, the gay, and the giddy.—See BALLS.

DANE-WORT. See Dwarf ELDER.

DANDELION, the COMMON, or *Leontodon Taraxacum*, L. is an indigenous, perennial plant, growing in meadows and pastures, on road-sides, ditch-banks, &c. It produces yellow flowers, which blow from April to September, and have the remarkable property of expanding early in the morning, and closing in the evening.

In the spring, while the leaves are white, and scarcely unfolded, they are an excellent ingredient in salads. In France, the roots and leaves are eaten with bread and butter. This plant is also relished by goats, and especially by hogs, who devour it eagerly; but sheep and cows dislike it, and horses totally refuse it: the seeds also support the smaller birds, which are extremely fond of them. The root, leaves, and stalk, contain a large proportion of bitter milky juice, which possesses considerable activity. Its more immediate operation is to remove visceral obstructions, and promote the urinary discharge. The dose prescribed by BOERHAAVE, for this purpose, is 4 ounces, to be taken three or four times a day; and we can, from experience, corroborate its great efficacy in dropsical, and those complaints which are connected with a disordered state of the first passages; though we have directed it to be taken in much smaller doses. The ancient Greek physicians were better acquainted with the properties of this excellent vegetable, than the modern practitioners, who appear to be more anxious to introduce exotics imported from distant countries, than to *ascertain* the qualities of those numerous medicinal plants which grow in their own climate. In short, we are induced to believe, that if the Great FREDERIC of Prussia had complied with the excellent prescription of the late Dr. ZIMMERMAN, who directed the extract of dandelion to be taken in moderate portions of two table-spoonfuls each time, that extraordinary hero and philosopher would have survived his last attack of dropsy, for many years; because his constitution was unimpaired, and his mind uncommonly vigorous; tho' he had from his infancy imbibed an invincible prejudice against all physic and its administrators.

DARNEL, or *Lolium*, L. a native genus of plants producing four species, namely:

1. The *perenne*, or Red Darnel, or Ray-grass, which grows on road sides and dry pastures; it attains the height of two feet, and flowers in June. As it makes good hay upon dry, chalky, or sandy soils, it deserves to be cultivated, especially with clover: It springs earlier than the other grasses; thus supplying food for cattle, at a season when it is most difficult to be obtained. But, though it is eagerly eaten when young, it is too dry and hard when converted into hay, by itself. Mr. SWAYNE hints in his "*Gramina Pascua*" (a most valuable publication for practical farmers, who wish to obtain a complete knowledge of the different pasture-grasses); that the common cultivated *ray-grass* had probably, by frequent sowing, degenerated from its natural qualities, and that it was in many respects inferior to that growing naturally in our best meadows and pastures. Mr. PACEY, an enlightened agriculturist, has lately raised a variety of ray-grass from seeds collected in old pastures, and has now multiplied it to such extent, as to sell annually a considerable quantity at the price of 10s. 6d. per bushel. It has, by the most competent judges, been proved to be infinitely superior to the cultivated ray-grass, and he has sufficient demand for his whole produce.—The red darnel is eaten by cows, horses, and sheep; but goats do not relish it.

2. The *temulentum*, or Bearded Darnel, a poisonous plant, which grows in ploughed lands among wheat, rye, oats, but chiefly among barley and flax. It flowers in July and August.—LINNÆUS observes, that the seeds of this plant, when mixed with bread-corn, produce but little effect, unless the bread be eaten hot; but if malted with barley, the beer becomes more intoxicating; and we may add, the drinking of it is attended with temporary blindness. According to the corresponding account of various authors, the bread made of corn abounding with these seeds, and eaten frequently, produces giddiness, anxiety, vomiting, purging, violent colics, convulsions, palsy, delirium, and death. Hence this plant ought to be carefully extirpated, by weeding, before it runs to seed.—Sheep are not fond of it.

3. The *arvense*, or White Darnel, or annual Beardless Darnel, which flowers in July, and is not frequent in fields. It is, however, sometimes very injurious to a wheat-crop, but may be easily avoided, by previously separating it from the seed.

4. The *bromoides*, or Drank; wild Oat-grass; or Sea Darnel. It grows on loose sands, near the sea coasts, and flowers in May or June. —Both the last mentioned species are not possessed of any peculiar properties.

DATE: See PALM-TREE.

DAY, in general, signifies that space of time during which it continues to be light, in contradistinction to *night*, or the period of darkness, while the sun is illumining the other hemisphere. Hence, the rising and setting of the sun are usually considered as the extent of the day, and the time that elapses from its setting to its rising again, as the night.

In consequence of the unequal length of days, resulting from the peculiar revolution of the planets producing the different seasons, we are inclined to think that many persons, especially in the higher walks of life, avail themselves of this irregularity; insomuch, that by the law of fashion, in winter they convert the night into day; and in summer exchange the most agreeable mornings and forenoons, for damp, unwholesome evenings and nights. It would be a vain attempt to reprobate this unnatural custom, in those circles where it is fancied to be equally vulgar to repair to bed in good time, and to rise early;—a practice instinctively followed even by the lower animals.

To the industrious and *more domestic* members of society, we venture to recommend, while in a good state of health, the following division of the day: namely, in spring and autumn to rise with the first rays of the sun; in summer, one hour after; and in winter, one hour before that luminary appears;—to allot every day (Sundays excepted), from 10 to 12 hours to useful occupations; from 6 to 7 hours to the various purposes of dressing, taking provisions, exercise, or amusements; and also from 6 to 7, or 8 hours, to repose, accordingly as they have been more or less fatigued the preceding day, either by mental or bodily exertions.—Such would be both a natural and judicious *arrangement of the day*; and we make no doubt that those who are disposed to devote their time and labour to the welfare of the community, will neither have reason to complain that the days are too long, or the nights too short, for useful purposes.—See BED-TIME.

DEAD-NETTLE, or *Lamium*, L. an indigenous plant consisting of three species, of which the following are the principal:

1. The *album*, or White Dead-nettle, or White Archangel, which is perennial, grows on rubbish, corn-fields, and ditch-banks, blooms in the month of May or June, and also in September. The flowers of this species have been much celebrated for their efficacy in pulmonary disorders, and in those incident to females; but their virtues appear to be precarious. Early in the spring, the young plant is eaten by the country people of Germany and Sweden, among their sanative, culinary herbs.

2. The *purpureum*, or Red Dead-nettle, Red Archangel, or Dee-nettle, which is an annual plant, grows in rubbish, corn-fields, and kitchen-gardens, and flowers in the month of May.—The leaves of both plants may be boiled and eaten as greens: the latter is relished by sheep, goats, and horses, but refused by cows.

DEAD-TOPS, a disease incident to young trees, which may be cured, by cutting off the dead parts close to the nearest sound twig or shoot, and *claying* them over in the same manner as is practised in GRAFTING, to which we refer.

DEAFNESS, the state of a person who is deprived of the sense of hearing; it is also used to signify a disease of the ear, which prevents the due perception of sounds.

Deafness is frequently the effect of old age, and is incident to most persons in the decline of life. It is, however, sometimes owing to an original defect in the organic structure of the ear; in which case the unhappy individual not only continues deaf, but frequently also speechless.—See DUMB.

This complaint may indeed arise from a variety of causes; such as injuries sustained by the ear from wounds; ulcers; excessive noise; violent colds in the head; fevers; hard wax adhering to the cavity of the ear; or, too great a degree of either moisture or dryness in that organ. When it is the effect of old age, or of wounds and ulcers in the ears, it is not easily remedied. If it proceed from a catarrh affecting the head, especially after cold-bathing, the patient must be careful to preserve that part constantly warm, particularly during the night: he should likewise take some gentle laxatives, keep his feet warm, and bathe them frequently in tepid or luke-warm water, at bed-time. Mercurial frictions have, in this case, been applied with success. But, if the complaint originate from fevers, it will generally disappear when the patient recovers his health; or if it arise from dry wax clogging the ears, this may be softened, by dropping a little sweet oil, or oil of rosemary, into them; after which they should be syringed with warm milk and water.

If deafness be occasioned by too great a dryness in the ears (which may be easily ascertained by inspecting them), half an ounce of the oil of sweet almonds, and the same quantity of camphorated spirit of wine, or tincture of asafœtida, may be mixed together, and a few drops poured into the ear every night, previously to going to bed; care being taken to close them afterwards with a little wool, or cotton. When the ears abound with moisture, the superfluous humour may be drained by an issue, or seton, which should be made as near as possible to the part affected.

Various other remedies have been employed for the cure of deafness; such as the gall of an eel mixed with spirit of wine; or equal parts of Hungary water, and spirit of lavender; to be dropped into the ear. ETMULLER highly extolls amber and musk; and BROOKS affirms, that hardness of hearing has often been cured by putting a grain or two of musk into the ear with cotton wool. Where, however, a powerful stimulant becomes absolutely necessary, camphorated oil, with the addition of a few drops of volatile alkaline spirit, may be considered as one of the most powerful applications. It will be proper, in such case, to begin with a very small quantity of the alkali, and to increase it progressively, as the ear is enabled to bear it. In several instances, where the disease depended on a state of insensibility in the nerves, both the shower-bath and electricity have been successfully resorted to.—We can from experience recommend a few drops of onion juice on cotton, to be worn in the ear for several weeks, and daily renewed.—Dr. SIMS judiciously advises deaf persons to expire forcibly, with their mouth and nose closely stopped; a simple but rational expedient, which ought to be frequently repeated, though it has sometimes afforded instant relief.

These various remedies, however, should be judiciously adapted to different states of the disorder; for, though real benefit has occasionally been derived from them, yet they also often fail, and, not unfrequently, are productive of injury.

jury. The organs of hearing, as well as those of sight, being extremely tender, require the most cautious treatment, and ought not on any account to be tampered with, nor submitted to the experiments of ignorant pretenders. Hence, instead of having recourse to *nostrums*, we recommend those persons, who are afflicted with deafness, *to keep the head warm*.—From whatever cause the disorder may originate, this will always be found the safest and most proper practice;—more real benefit has often been derived from it, in the most obstinate cases, than from any medicines whatever.

DEAL, a well-known wood, being the production of the fir-tree, and of great utility for building, and other purposes.

An excellent method of seasoning planks of deal and fir is, to immerse them into salt-water, as soon as they are sawed, for three or four days; care being taken to turn them frequently during that time. They should then be exposed to the sun and air, which will in a considerable degree harden them, though it will not prevent them from shrinking.—See TIMBER.

By the stat. of 13 and 14 CAR. II. c. 2; and 6 GEO. I. c. 15, no deal-boards or fir-timber may be imported from the Netherlands; but fir-timber, fir-planks, and deal-boards, the growth of Germany, are importable from any place in that country, by British subjects only, in British-built ships, legally navigated. By 39 GEO. III. c. 3, deal-boards, fir, and timber, may be imported in British-built ships, owned and navigated according to law, from Hamburgh, Bremen, Altona, and Gluckstadt, until the 1st of August, 1802.—See FIR-TREE.

DEATH, a term more easily understood than defined. Although it may generally be said, that death consists in the separation of the soul from the body, yet this explanation is so far imperfect, as we possess but a distant idea of the connexion subsisting between the mind and the animal frame: nor does the definition here stated express any more than the effect, but leaves us completely ignorant of the cause of that great event, or the physical process by which dissolution is accomplished.

In order to prepare the reader for more clearly understanding the symptoms of actual dissolution, we shall briefly relate the gradual decay preceding this catastrophe.

The human body is, from its birth, liable to continual changes, in consequence of the different vital, animal, and other functions, it performs: till it attains a certain age, let us suppose that of *thirty-five* years, in a state of perfect health, these changes tend to improve its solidity, strength, and sprightliness, without detracting from its organic vigour. After that period, which we may venture to call the *meridian of life*, it gradually declines. The smallest fibres become rigid; the minute capillary vessels corrugate, admit no fluids to pass through them, and at length change into fibres; the larger blood-vessels grow hard and narrow; in short, all the outlets of the body become contracted, and in a manner close: whence the dry, shrivelled, and inflexible state of old age. Thus, the interior organs every day become more inert in performing their functions; the humours stagnate, thicken, and at length are partly converted into solids: hence the skull and other bones are much thicker in the aged than in other adults. Digestion is weakened; assimilation is prevented; and all the animal function are gradually impaired: the skin, that wonderful contrivance in the animal economy, ceases to perform the important offices of absorption and perspiration—the myriads of pores are closed—the blood-vessels no longer impel the vital fluid, and are become inert as the time-piece, the spring of which has been neglected by the artist. At length, reduced to a state bordering on vegetable life, in the same ratio as plants are linked to minerals, the connection that hitherto subsisted between our mental and physical nature, is totally dissolved; or, in other words, *death* is the necessary consequence.

Few persons, however, arrive at the stage of life we have just described: by far the greater proportion of human beings die in their infancy, or are cut off in the bloom of life, by a long and horrid train of diseases. Besides, there are numberless accidents to which we are daily liable; nay, all the elements which surround us, may prove, according to the use we make of them, either salutary or fatal.—In this place, therefore, we shall give a concise view of the most unerring signs of death, if taken collectively; and explain the treatment to be adopted in the different casualties, such as DROWNING, &c. in the order of the alphabet.

SYMPTOMS OF DEATH: 1. Cessation of the pulse; 2. Total suppression of breathing; 3. Loss of animal heat; 4. Rigidity of the body, and inflexibility of the limbs; 5. Relaxation of the lower jaw; 6. Inability of the eye-balls to return to their sockets, when pressed by the finger; 7. Dimness, faintness, and sinking of the *cornea*, or the uppermost horny coat of the eye; 8. Foam in the cavity of the mouth; 9. Blue spots of various sizes, and on different parts of the body; 10. A cadaverous smell; and, 11. Insensibility to all external stimulants.

All these symptoms, however, if individually considered, are far from being conclusive: they then only afford a certain criterion of death, when most or all those appearances concur at the same time, especially if the 6th, 7th, and 10th of the signs be strongly marked.

One of the most infallible methods of distinguishing *apparent* from *real* death, is that lately suggested by Professor CREVE, of which we shall give a short account, under the head of GALVANISM.

APPARENT DEATH, is that state in which life is suspended, either because the body is not susceptible of external stimuli, or the interior organs are in a state similar to that of palsy.

Dr. STRUVE, in his *Practical Essay on the Art of recovering Suspended Animation*," lately translated from the German (12mo. London, 1801, 3s. 6d.), exhibits the following view of all the

Symptoms of Life: A slight degree of warmth in the region of the heart, accompanied with contractions and dilatations; a vibrating motion of the whole body, especially after being sprinkled with cold water; and a convulsive tension of some muscles.

Doubtful Signs: Rigidity of the

limbs, gradual smoothness of the skin, warmth and redness in particular parts of the body, hiccough, contraction and hissing of the nostrils, a tremulous motion of the whole body, mucus issuing from the nose during the artificial inflation of the lungs, a slight convulsive motion of the mouth, and a firm compression of the teeth.

More certain signs: Gentle throbbing of the heart; pulsation of the temporal arteries; a slight convulsive motion of the inner corner of the eye; vibration of the eye-ball; and almost imperceptible convulsions of the muscles surrounding the neck.

Distinct signs of Life: A gentle motion of the jaw; gradual redness of the lips and cheeks; contraction of the different muscles in the face; convulsive motions of the toes; sneezing; tremor of the whole body; vomiting; respiration interrupted by coughing; and groaning.

DEATH-WATCH, or *Termes pulsatorium*, L. a small insect that harbours chiefly in old wood. It is produced from a very minute white egg, which is hatched in the month of March.

When these vermin first leave their shells, they are scarcely perceptible, without the aid of a microscope: from this diminutive size, they gradually acquire their perfect state, when they are about 5-16ths of an inch in length, and of a dark brown, spotted colour.—They are remarkable for the ticking noise, similar to that of a watch, which is made by the male and female, when wooing each other. This expression of mutual affection was formerly considered, by the superstitious, as a presage of death in the family where it was heard; from which circumstance the insect has received its name.

DEBILITY, is that feeble state of life in which the vital functions are languidly performed; when the mind loses its cheerfulness and vivacity; when the limbs are tottering with weakness, and the digestive faculty is impaired.

This complaint, which at present is so prevalent, even in the bloom of life, and among those who ought to form the most vigorous and robust part of a nation, may arise from a great variety of causes, of which the following are the principal: 1. Descent from enfeebled parents; 2. Changes in the admixture, and component parts of the surrounding atmosphere; 3. A sedentary and indolent mode of life; 4. Immoderate sleep; or, in a still more hurtful degree, want of the necessary portion of sleep and repose; 5. Too great exertions either of mind or body; 6. The *unnecessary* and *imprudent* use of medicines; lastly, the almost total disuse, and exclusion of gymnastic exercise, and the general introduction of *sedentary games*, the effect of which creates an almost universal apathy to every pursuit that requires exertion.

Debility is the source of numerous disorders, such as spasms, palsy, violent evacuations, hemorrhages, putrid and nervous fevers, fainting fits, and apparent death.

The means employed for the preserving and maintaining *feeble life* (says Dr. STRUVE, in his *Asthenology*; or, the Art of preserving feeble life, 8vo. 8s. 1801), are as various as the causes on which it depends, and the disorders with which it is generally accompanied. The first object that claims the attention of persons in this state, is *warmth*; the external application of which ought to be proportioned to the temperature of the body, and gradually augmented, accordingly as the natural warmth of the individual increases. If duly applied, gentle heat possesses both stimulating and strengthening properties, by which the activity of the vital principle is excited and supported. The communication of warmth may be considerably facilitated by the use of the *tepid* or warm bath, of which we have already spoken, vol. i. p. 190.

The next, and one of the most important objects to debilitated persons, is *diet*; in which respect much depends on their previous habits and modes of life. If they carefully attend to the peculiarities of their constitution, and observe whatever is to them salutary or hurtful, they may prolong their lives for a considerable time; provided their conduct be guided by the necessary knowledge and experience. In short, to guard against excess, and pursue a middle course, will be the best means of accomplishing the most salutary end.

Debilitated persons ought to be imperceptibly hardened;—the transition to a severer and more invigorating course of life must be so progressive, that the convalescent be not subjected to any disagreeable restraint; and this method should likewise be continued for a sufficient length of time, during which he ought never to return to his former debilitating habits.

Such invalids should eat only a very small proportion of animal food, namely, white meat, which is least stimulating, together with a due quantity of the most nutritious vegetables. They may also partake of small portions of flesh-broth, thickened with sufficient bread, rice, &c. to render it more nourishing and less flatulent; but they ought to abstain from fat, and milk, unless the latter be given immediately after it is drawn from the cow.

If solid food cannot be allowed, or if it irritate the stomach, recourse must be had to gelatinous aliment, such as eggs, nourishing soups, salop, barley broth, shell-fish, &c.; which, if taken in small quantities, are exceedingly strengthening.—Persons of this description ought to accommodate their whole dress to the climate, and changes of the weather; they should at all times endeavour to procure a middle temperature between cold and heat; for instance, from 60 to 65° of FAHRENHEIT's scale. Woollen clothing is, in this respect, far preferable to fur; as the latter heats the body, and increases perspiration. Flannel, if worn next the skin, will preserve the human frame in a more equal temperature than is attainable by any other substance; and at the same time protect it from the hurtful influence of the two extremes.

Individuals, in this state, require longer and less disturbed rest than those in perfect health and vigour. Labour and exercise, adapted to their habits and strength, will greatly promote that desirable object; likewise the tepid bath; a clean, and not too soft couch; an airy, healthy, and capacious apartment; but particularly a calm and composed mind; which last possesses a most powerful influence in preserving health and life; for, without tranquillity, all other means will be ineffectual. — For a more particular account of the causes, symptoms, and cure of debility, we must refer to Dr. STRUVE's elaborate work, before mentioned, in which this subject is minutely discussed.

DECANTER: See BOTTLE.

DECIPHERING, or DECYPHERING, the art, or act of discovering the alphabet of a cypher, or of explaining a letter written in cyphers, or secret characters.

Every language has peculiar rules of deciphering, which depend not only on the form of its characters, but also on the place, order, frequency, combination, and number of the letters. The importance of this science to politicians has long been acknowledged, and several ingenious philosophers of the 17th century, published profound treatises on this subject; but, as it would be deviating too widely from the avowed plan of this work, to enter into the theory of deciphering, we can only refer the curious, who desire farther information on this head, to the 12th volume of the *Gentleman's Magazine* for 1742, where they will find the art of deciphering deduced from principles, and explained by examples in several languages. It deserves to be remarked, that there is extant, in the library of Oxford, a collection of letters written in cypher, about the time of CHARLES the Second, and decyphered by Dr. WALLIS, the most eminent scholar this country ever produced, in that branch of mystical grammar. Mr. W. WALLIS, a descendant of that learned divine (whose "Life and Sermons" he has lately published), is in the possession of another volume of *Decyphered Letters*, with their keys in various cyphers and characters; the whole of which contains much information relative to the transactions of those times; as the Doctor held the appointment of decypherer to that suspicious king.

DEED, an instrument written on paper or parchment, which relates principally to the conveyance, or transferring of property, and the validity of which consists in the following essential particulars: 1. Proper parties to contract with one another, and a proper subject matter to be contracted for; 2. A good and sufficient consideration; 3. Writing on parchment, or paper, duly stamped; 4. Sufficient and legal words, properly disposed; 5. Reading (if it be desired) before execution; 6. By stat. 29 CAR. II. c. 3, in many cases signing also; and, lastly, delivery which must be done either by the party himself, or by his attorney, lawfully authorised, and expressed in the attestation. If any of these requisites be wanting, the deed is absolutely void, from the beginning.

The preservation of deeds is an object that has ever engaged the attention of the lawyer and the antiquary: it is of still greater importance to those who hold estates or other tenements, in order to enable them to peruse such papers as have been kept for a series of years, and which from moisture, or other causes, are almost illegible. To facilitate this desirable object, we select the following, as being the most simple of the many recipes which have been recommended: Immerse the parchment obliterated by time, into a vessel of cold water, fresh drawn from a well: in the space of a minute, it should be taken out, and pressed between two blotting papers, to prevent it from shrivelling, while it is drying. As soon as it is moderately dry (if the characters be not legible), the operation should be repeated two or three times. Thus, the skin will resume its pristine colour, and appear throughout alike.

DEER, the *Fallow*, Buck and Doe, or *Cervus Dama*, L. a well-known animal abounding in the forests and parks of this country.

Deer are of various colours; being reddish, deep brown, white, or spotted: they are easily tamed; and their flesh, which is called *venison*, is in high esteem among epicures. It is an excellent aliment; but, to the very great detriment of health, venison is seldom eaten till it is half putrified, or (as connoisseurs in this important article express themselves) till it has a *proper fumet*; though the flesh of this animal is naturally inclined to putrescency. When properly dressed, it affords a mellow food, and is easily assimilated to the human fluids: it ought always to be roasted or stewed, as it is otherwise apt to become dry and fibrous, from the constant motion of the deer, while alive. Hence such food is of a heating nature; and persons who are pre-disposed to the scurvy, or to other cutaneous diseases, ought to abstain from it, especially during the summer.

Deer-skins have been long celebrated for their softness and pliability; and the manufacturing of them into breeches and gloves, affords subsistence to a very numerous and industrious class of people.

Beside their utility, as an article of food and clothing, several parts of the deer were, in superstitious times, often employed in medicine. Their *blood*, if drunk immediately from the vein (according to Doctor James, the inventor of the fever-powders), completely relieves *giddiness in the head*: their gall is said to be detergent, to cure dimness of sight, and to remove films from the eyes; the liver is recommended against diarrhœas; and their horns and suet are applied to the same purposes as those of the Stag, to which we refer.

DEFORMITY generally signifies the want of that symmetry and uniformity, which are necessary to constitute the beauty of an object; it is more particularly applied to the human frame.

The chief cause of the personal deformity so frequent at present, is the neglect of paying proper attention to the clothing of infants, by which they are deprived of the free use of their limbs; and thus, in a great measure, rendered unserviceable to society. But, though deformity may apparently be prejudicial to health, it is ultimately a real advantage. Deformed persons, it is true, possess a less share of strength than others; they should therefore be naturally more careful to preserve it, as well as their health; which can be effected only by a strict adherence to temperance. This object will likewise be considerably facilitated by moderate exercise, which few, in such a situation, can want strength to perform; and, as they are not calculated for violent exercise, they are consequently exempt from all the disorders arising from that source; and may thus attain a mature old age. For a further investigation of this subject, we refer the reader to an ingenious essay, intitled "*Deformity*," by Mr. Hay, in 8vo. published in the year 1753, and of which a new edition appeared a few years since, collectively with his other works, in 2 volumes, 4to. where it is amply discussed.

DEW is a light, thin, and transparent vapour, slowly exhaling and ascending from the earth, in spring and summer mornings, while the sun is below the horizon, and then deposited on vegetables, in the form of small globules.

Naturalists rank *dew*, in general, among the numbers of watery meteors; some, however, term it a liquefied vapour, precipitated in drops; others, a vapour having a similar relation to frost, as rain has to snow, &c.—It is admitted, that dew cannot fall before it rises; and that its origin and matter, no doubt, is from the vapours and exhalations of the earth and water, as will be briefly stated under the article EVAPORATION.

That dews are more copious in spring than in any other season, arises from the greater stock of vapour collected on the surface of the earth, and the previous small dissipation of it during the cold and frost of the winter. Hence the truth of PLINY's remark is evident, that *Egypt* abounds in dews throughout the hot part of summer; for, as the air during the day is too hot to condense the vapours, they never form clouds, and consequently produce no rain: thus, in climates where the days are excessively hot, and the nights remarkably cold, the vapours, rising before or after sunset, are readily converted into dew.—In the more temperate climates, they ascend and fall in greater abundance after rain than after dry weather. There are some places in which dew is observed only to rise, but never to fall; and again others, in which it is carried upward in a more considerable proportion than downward, on account of the prevalence of winds by which it is dispersed.

Many whimsical properties and effects have, by the chemist, been attributed to common *dew*; but we conceive that, in its physical nature, it differs very little from *rain*; except, however, that the former is more subtle or penetrating than the latter. Hence it will be found that the leather of shoes and boots is more thoroughly soaked by walking one hour in a dewy meadow, than by exposing them double that length of time to rain-water.—See LEATHER.

It is farther remarkable, that plants continually exhale dew through the orifices of their vessels, and that this moisture is not a vapour collected by their leaves, as has often been erroneously believed. Each plant exhales this dew, according to the peculiar structure of its organs, and the situation of their orifices. Even shut up in vessels, and covered under glasses, plants have collected a greater quantity of dew during the night, than those standing in the open air. Of this nature, likewise, is the oily or honey-dew, which is sometimes exhaled by trees, as well as herbs, during the summer, and which has been found to settle on the oak, ash, &c.

MAY-DEW, is that which falls in the beginning of summer, but especially in the month of May. It is of a yellowish colour, and many virtues are attributed to this liquid. It is principally used for whitening linen and wax; which, if exposed to it, will gradually acquire a beautiful white.

DEW-BORN, in animal economy, a distemper to which cattle are subject: it is a swelling, or distension of the body, to such a degree,

gree, that the creatures affected are in danger of bursting. This malady is occasioned by turning them into rank pasture, or feeding them with watery grasses. When they are thus distended, they ought first to be driven, or moved about briskly, and then properly purged. Should this treatment not relieve them, blood-letting in the tail will be necessary; after which the top of an egg should be broken off, and a sufficient quantity of the white poured out to admit the powder of a nutmeg. These ingredients are to be well mixed, and the whole, together with the shell, forced down the throat of the animal, which should then be gently walked about; and thus it will speedily recover.

DIAMOND, a genus of siliceous earths, and the hardest of all the stones hitherto discovered; it is in general transparent, but is sometimes found of a rose-colour, or inclining to green, blue, yellow, or black.

The most valuable diamonds are those of a complexion similar to that of a drop of water: their price also increases in proportion to the regularity of their form, and accordingly as they are free from spots, stains, flaws, specks, and cross veins. Diamonds are found chiefly in India and South America, whence they are brought to Europe in a rough state, in the form of roundish pebbles with shining surfaces. There is, however, a kind of diamonds, which are but little esteemed, found in various parts of Europe, and also in this country, in the county of Cornwall, where they are called *Cornish diamonds*. These may, with more propriety, be termed crystals; they are found in digging the tin-mines of Cornwall, and are, in general, bright and clear, except towards the root, where they are coarse, and assume a whitish colour.

It is remarkable that *genuine* diamonds, when exposed to the rays of the sun, attract light which they again emit, and appear luminous, in the dark. The largest jewel of this description, in the world, is at present in the royal treasury of Portugal: it is of an oval figure, measures about 4 inches by 3, weighs 1680 carats, or 12½ ounces, and is valued at 224 millions sterling.

Independently of the purposes to which the diamond is subservient as an ornament, especially in the dress of females, the smaller particles of it have, since the 16th century, been employed for cutting glass; and, when reduced to an impalpable powder, are very useful for polishing other precious stones, as well as for engraving on those which possess an inferior degree of hardness.

For the valuation of diamonds of all weights, Mr. D. JEFFERIES, an ingenious jeweller, who published a treatise on diamonds and pearls, several years since, lays down the following rule: He first supposes the value of a rough diamond to be settled at 2l. per carat, at a medium; then, to find the value of diamonds of greater weight, he directs to multiply the square of their weight by 2, and the product is the value required. On this principle, Mr. JEFFERIES has constructed tables of the price of diamonds from 1 to 1000 carats, which the curious reader will find in the work before mentioned, of which a new edition appeared a few years since, in 8vo. price 12s.

DIARRHŒA, or LOOSENESS, is a frequent and copious evacuation of liquid excrement by stool.

This malady is very common, being either a primary disease, or only a symptom or effect of another. In many cases, it is a salutary effort of Nature, and therefore should never be stopped, unless it continue too long, or evidently weaken the patient. Infants, adults of tender and delicate constitutions, and those who are of a choleric, or a sanguine habit, are peculiarly liable to this disorder, which may be occasioned by too great a quantity of aliment being taken into the stomach; by the acrid or flatulent nature of the food; by an impaired state of digestion; by various passions of the mind; by diseases of other parts, or of the general system. Many other causes might be enumerated, but these will be sufficient to shew the propriety of not attempting to adopt, in this instance, an *uniform* mode of treatment.

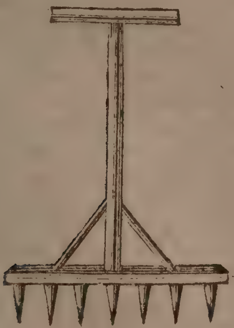
Where looseness is occasioned by excess, or repletion, or from improper food, a gentle emetic may be safely administered, as it will not only cleanse the stomach, but promote all the secretions. The patient ought then chiefly to live on light vegetable dishes, and to drink whey, thin gruel, or barley-water. If a diarrhœa be the consequence of violent passions, or affections of the mind, it requires to be treated with the utmost caution. Very mild laxatives, sometimes gentle opiates, and other antispasmodics, are in such cases the most proper; particular care ought to be taken, to restore chearfulness, and tranquillity of mind; as, without this, medicines will be of little or no service.

Those persons who, from a peculiar weakness, or too great an irritability of the bowels, are liable to periodical or frequent returns of this disease, ought to live with a constant regard to temperance, and avoid all crude summer fruit, and provisions of difficult digestion. They should, likewise, strictly guard against cold, moisture, or whatever may tend to obstruct perspiration; wear flannel next their skin; and carefully avoid every inducement to the depressing passions of fear, anger, &c. Nutritive drinks, such as broths, gruel, &c. with the addition of rice, or toasted bread, may be taken freely; but, beyond these, the patient should not venture without medical aid, unless he be able clearly to ascertain the cause on which his complaint depends.—See Bile.

DIBBLE, or Dibber, a simple but useful implement in gardening, for the purpose of setting out young plants, &c. Within these few years, it has been employed for *dibbling wheat*, and the whole process consists in making perpendicular holes an inch and a half or two inches deep, in the same manner as is usually done in planting potatoe-roots. These holes are made by a man who has a proper staff, shod with iron, in each hand; and, as he walks backwards, is able, by looking at the part of the row already formed, to keep nearly in a strait line, and to make two holes at once, about four inches distant from set to set in the rows. Two or more children attend him, and drop two, three, or four seeds into every hole, which are afterwards covered by drawing over them what is called a *bush-harrow*.

This method is deservedly considered one of the greatest improvements in agriculture. It appears to have originated from the planting of grain in a garden, from mere curiosity, by persons who neither designed, nor had any opportunity of extending it to a lucrative purpose. Nor was it attempted on a larger scale, till an industrious farmer, in the vicinity of Norwich, began to dibble on less than an acre of land. The success of this experiment induced others to follow his example, and notwithstanding the ridicule they incurred for adopting so singular a practice, their crops were not only larger, but likewise so much superior to those of others, that *dibbling* has become the practice of every intelligent agriculturist in Norfolk, whence it has spread into several other counties.

From a conclusive experiment made by the Rev. H. J. Close, of Trimley, near Ipswich, in the years 1783-4, it appears that drilling, or dibbling, greatly exceeds the broad-cast husbandry (see vol. i. pp. 359 and foll.), on the best cultivated soils; and, besides the increased produce of grain, many other advantages arise from the former method. For instance, it employs a greater number of labourers, especially women and children that cannot be serviceable in the common mode of culture. Mr. Close employed the following frame for setting wheat:



This implement is two feet two inches wide, and provided with seven tines; but Mr. C. has since experienced that a frame of similar width, with *five* tines only, is preferable to one of *seven*.

The lands on which this method may be practised with the greatest advantage, are either those after a clover-stubble, or where trefoil and grass-seed were sown in the spring before the last. These, after the usual manuring, are once turned over by the plough in an extended flag or turf, at ten inches wide, and the wheat is set in the manner already described. By this mode, three pecks of grain are sufficient for an acre; which, being immediately buried, is equally secured against the depredations of vermin, or the power of frost. The regular manner in which it rises, affords the best opportunity of keeping it clear from noxious plants, by weeding or hand-hoeing.

Dibbling is peculiarly beneficial when corn is dear; and, if the season be favourable, may be practised with great benefit, both to the public and the farmer: as it saves six pecks of seed-wheat per acre; and, if generally adopted, would of itself afford bread for more than half a million of people. It should, however, be observed, that in seasons when corn is sold at a low price, or the autumn unfavourable to the practice, it cannot be practised with advantage. Thus, in light lands, a very dry season prevents dibbling, because the holes will be filled up as soon as the instrument is withdrawn. In like manner, on strong and stiff clays, if it be very wet, the seeds in the holes cannot be properly covered by the bush-harrow. These two extremes, however, seldom happen; nor do they affect lands of a moderately consistent texture, or both light and heavy soils at the same time; so that they never preclude the general adoption of this useful and rational mode of saving seed-corn.

DIET, in animal economy, a regimen or course of living, adapted both to the preservation of health, and its recovery, especially from chronical diseases.

The dietetic treatment ought to be conformable to the different constitutions of individuals. Those whose solids are relaxed and weak, should avoid all tough or viscid food, and such as is difficult to be digested. Their nutriment, however, ought to be substantial; and they should take frequent exercise in the open air. The plethoric, or those who abound with blood, cannot more effectually consult their health, than by a sparing use of whatever is in a high degree nourishing, as fat-meat, rich wines, strong ale, &c. Their aliment should consist chiefly of bread, or other vegetables, and their drink of water, whey, or small beer.—See Corpulency.

Persons of a lean habit ought to follow a course directly opposite to that before suggested. Those who are troubled with acidity, should live chiefly on solid meat; and those afflicted with hot alkaline eructations, should principally use acid vegetables. Invalids subject to the gout, to low spirits, to hypochondriac, or hysteric disorders, should avoid all flatulent food, as also all salted, or smoke-dried provisions, and whatever is difficult of digestion, or apt to turn sour and rancid on the stomach.—Their food should be light, spare, cool, and of an opening nature.

Another important object to be considered, is the manner of life and age, together with the season and constitution. Those whose inclination, business, or profession lead them to a sedentary life, ought to be more sparing as to the *quantity*, and more attentive to the *quality* of their aliment, than others whose pursuits are widely different, or who are accustomed to take much exercise: the former ought particularly to avoid the use of every thing that is sour, flatulent, rancid, and oppressive to the digestive organs.

Persons liable to particular diseases, should be cautious in eating whatever tends to aggravate them. The gouty, for instance, should avoid drinking rich wines, strong soups, or acids. Those who are subject to the gravel, ought to shun all austere and astringent aliments; nor should the scorbutic indulge in animal food.

The aliment in early life ought to be light, nourishing, and taken frequently, but in moderation: that of adults should be solid, and sufficiently tenacious; the diet proper for those advanced in life, should resemble that of infancy.—At every period of life, gluttony ought to be sedulously avoided; for, not unlike too great abstinence, it destroys the powers of digestion; but the moderate repetition of aliment is necessary for restoring the continual waste of the body.

Diet ought also to be regulated according to the different seasons of the year; because variations in the atmosphere produce corresponding changes in animal bodies. In consequence of the increased elasticity of the air, in the winter, the fibres are stronger, and better qualified for performing their various functions, and for digesting the stronger kinds of food. If there be no particular reason for the contrary, generous wines, and wholesome ale, together with warm broths and infusions, may be then taken, to promote the insensible perspiration, which is in some degree checked; as the cold air remarkably contracts the cutaneous pores. Some attention should also be paid to this circumstance, that the perspiration bear a due proportion to the liquid and solid nutriment consumed.

In the spring, the quantity of food ought to be somewhat diminished, and an additional allowance of the liquor usually drunk, might be granted. In autumn, similar regulations are to be observed, as in the spring; because the moisture and density of the air are nearly the same, and the weather is equally variable; so that perspiration is easily obstructed. During the summer, health may be most effectually preserved by vegetables, and diluent liquors. Considerable care should be taken to abstain from provisions that are heavy and difficult to be digested, but especially from wine and brandy.

The feeble and convalescent ought to eat frequently, and but little at a time: the number of meals should be proportioned to the weakness of their frame;—for it is far less hurtful to a debilitated person, to eat a few mouthfuls every hour, than to make two or three *hearty* meals in one day: an exception, however, ought to be made with respect to those who are naturally of a delicate and irritable constitution. — See FOOD and DRINK.

FAMILY-DIET. After the various and successful experiments made by Count RUMFORD, and others, who have written on domestic economy, little novelty can be expected in this article; but as the present work might be considered as incomplete, without some information on this important subject, we have selected a few practical hints which appear to merit particular attention.

Dr. LETTSOM has observed— (*"Hints designed to promote Beneficence, Temperance, and Medical Science,"* 8vo. 1797), that *pies* are more advantageous than either roasted or boiled meat. This he illustrates by an account of a dinner, where *eight* persons were completely dined off a pye, consisting of 24 oz. of wheaten flour, 64 of mutton, and eaten with 8¼ oz. of bread; weighing in the whole 96¼ oz., while 60 oz. of mutton *roasted*, and eaten with 33 oz. of bread, weighing in the whole 93 ounces, dined only *five* of the same persons.

Milk pottage is far more wholesome than tea with bread and butter; and, if made after the following manner, is in many respects preferable to milk alone: Let equal quantities of milk and water be boiled up with a little oatmeal, which will break the viscidity of the milk, and be at the same time more easily digested than the latter in an undiluted state. Besides, oatmeal is a much warmer nourishment than wheaten flour, and agrees better with weak stomachs.

Potatoes, if properly boiled, are an excellent and nutritious food. Particular care ought to be taken that they be good, and nearly all of the *same size*; the larger and smaller ones should, therefore, be boiled separately. They must be washed clean, without paring or scraping, and put into a pot with cold water, but not sufficient to cover them; for their own juice will supply the apparent deficiency. If the roots be of a large size, as soon as they begin to boil, some *cold* water should be poured in, and occasionally repeated, till they are boiled through to the centre: otherwise they will crack and burst on the outside, while the inside will remain half raw. During the time of boiling, a little salt should be added, and the slower they are cooked, the better will be their flavour. As soon as potatoes are done, the water should be poured off, and the roots re-placed over the fire, in order that their moisture may evaporate, and they become dry and mealy; in which state they may be served up, without being previously peeled. This method of boiling or stewing potatoes, is in every respect superior to that of steaming; as by the former process they may be dressed in a shorter time, and will retain no moisture.

Potatoes may be made into puddings, which will both prove an agreeable change of food, and be at the same time uncommonly nutritious. Dr. LETTSOM directs 12 oz. of potatoes, boiled, skimmed, and mashed; one oz. of suet, and an equal quantity of milk and cheese, to be mixed together with boiling water to a due consistence, and baked. An ounce of red-herring may be occasionally substituted for the cheese, and will give the pudding a flavour which is relished by many.—See POTATOES.

Barley-broth is an wholesome and nourishing dish; which, as it may be made with almost every kind of garden vegetable, is never out of season. Onions, leeks, and parsley, generally constitute part of the ingredients, to which may be added cabbage, or greens, turnips, carrots, and peas. These are to be mixed with 4 quarts of water, 4 pounds of beef with the bones, 4 oz. of common barley-meal, and stewed together for two hours, when the herbs may be added, being previously cut small, and likewise a small quantity of salt. The whole should then boil till it be tender, and the fat skimmed off or not, at pleasure. Onions or leeks should never be omitted.

There is another article of domestic economy which is usually classed under the name of *Pottage*, for the making of which we have subjoined one or two recipes:

1. Take 3lbs. of the sticking piece of beef, a part of the shin, or any coarse piece. Boil it in eleven quarts of water for two hours; then add a pound of Scotch barley, and boil it four hours longer, when 6lbs. of potatoes may be added, and half a pound of onions, together with a small proportion of thyme, pepper, and salt. With these may be mixed other vegetables, and half a pound of bacon cut into small pieces. The whole should be boiled over a slow fire, that it may acquire a proper consistence. It will yield three gallons of excellent and nutritious pottage, and has been found amply sufficient for twenty soldiers, without bread; the nature of the food not requiring any. The expence of this was a few years ago about 2d. per head; but, at the present advanced price of provisions, would at least be double.

2. Take of beef 1 pound, potatoes 2lbs. Scotch barley, one-third lb., a similar quantity of onions, together with a small proportion of salt and pepper, and 3 oz. of bacon. The whole expence of these ingredients will be about 18d. Let them be well boiled in a due quantity of

water, and they will afford nutriment sufficient to dine and sup three persons, without requiring either bread or beer.

Messes, or pottages like these, are doubtless far preferable to the common dishes, consisting of fat bacon and cabbage, with which a considerable quantity of bread and beer are always consumed. We, therefore, seriously recommend the adoption of such or similar measures of prudent frugality, to all classes of society, especially at the present period, when all the necessaries of life have, partly from real, and partly from artificial scarcity, been raised to an exorbitant price. Those benevolent minds who feel an interest in this useful inquiry, we are obliged to refer to the "*Reports of the Society for increasing the comforts and bettering the condition of the Poor*," where they will find the subject minutely discussed, and many gross, though common, errors in domestic economy ably exposed.

DIGESTER, an instrument serving to dissolve solid animal substances, in a manner similar to that performed by the stomach. This vessel was invented by PAPIN: after putting meat into it, together with a sufficient quantity of water, a lid is closely screwed on, so as to admit no external air. By a moderate fire, the meat will, in the course of six or eight minutes, be reduced to a perfect pulp: by augmenting the heat of the fire, or extending the time of digestion, the hardest bones may be converted into a pulp or jelly. This effect is produced by the most perfect closure of the vessel, which prevents the access or escape of air, so that the reverberations occasioned by the expansion of the aërial fluid, dissolve the whole into an uniform body, and mix the aqueous, saline, oleaginous, and other particles so strongly together, that they cannot be easily separated; but, while hot, appear one liquor, and, when cold, form a jelly, of a strength proportionate to the quantity of flesh or bones dissolved in the water.

This useful instrument has not been hitherto applied to culinary purposes; though within the last two years an imperfect imitation of it has been vended in the shops; and we state with satisfaction, that even the latter is incomparably more economical than the various kinds of stew-pans formerly employed. Cast-iron digesters are now manufactured, of various sizes and prices. We understand that the most complete articles of this description may be had of Messrs. JACKSON and MOSER, Dean-street, Soho; or of Mr. DOWNER, Fleet-street, London; both of whom have, we believe, obtained patents for their improvements in this valuable culinary utensil.

DIGESTION, in animal economy, signifies the dissolution of food taken into the stomach, in order to supply the continual loss sustained by perspiration, the different functions, or by exercise.

As soon as the food is taken into the mouth, it is first broken and divided by the teeth, being at the same time moistened with a liquor supplied by the salival glands, and consequently formed into a kind of paste. Thus prepared, it passes into the stomach to ferment; a process which is effected, 1. By the salival and gastric juices, which have an effect on aliment similar to that of leaven, or yeast, on dough; 2. By the vital heat of the stomach and viscera of the abdomen;

men; 3. By the remains of food, which adhere to the folds of the stomach, and there become acid and acrimonious; 4. By the agitation ariſing from the pressure of the abdomen, and the continual pulsation of the contiguous blood-vessels; 5. By the liquor which the repeated compression of those muscles causes to be discharged from the glands of the stomach: and, lastly, by air itself, which being mixed with alimentary matter, dilates by the heat of the stomach, and separates the particles of food which, from the concurrence of these causes, are converted into chyle.

From the stomach, the chyle descends into the intestines, where it incorporates with the blood; which, by its volatile nature, together with the saline and nitrous parts of the air, subtilizes the aliment, and perfects its digestion. These powers, however, are frequently impeded, or weakened, from a variety of causes, too minute to be specified here, but which will be occasionally mentioned in their alphabetical series.—See INDIGESTION.

DIMNESS OF SIGHT, in farriery, a disorder in horses proceeding from blood-shotten eyes. If the eye-ball be sound, a cure may be effected by keeping the horse warm, with a linen hood fitted to his head, and by anointing his eyes twice a-day with a composition of sugar-candy, honey, and white rose-water. In two or three days, the eyes will be well; after which the creature should be blooded. In the progress of this malady, blisters generally rise on the eye, which it would be dangerous to touch, as they will gradually disappear on the recovery of the animal.—See SIGHT.

DINNER, a very significant term in domestic economy, as it expresses the principal meal, or that which should be eaten about the middle of the day.

Although most nations which aspire to civilization, have adopted the custom of taking meals at certain hours of the day, and especially the dinner, yet such practice does not appear to be consonant with just principles of the animal economy, or with a critical regard to health. In the present *artificial* state of society, however, it would probably be attended with many inconveniencies, to infringe upon the established order; and to resort to the table, only when we are induced to take food, in consequence of the cravings of a *natural* appetite. But those who are in any degree acquainted with the structure of the digestive organs, will readily agree with us, that the activity of the stomach, in healthy individuals, is never totally suspended, either during profound sleep, or the most intense application to study. And as the whole process of digestion and assimilation is, according to the most attentive observers, performed in about *four* hours, if the stomach has not been unnaturally distended by superfluous food, it follows, that it is contrary to the order of Nature, to swallow a larger quantity of provisions, at one meal, than we are able to digest during that time.

On the other hand, it will be objected that the plan of a *more regular division of meals* could not, without difficulty, be adopted by those who have been insensibly accustomed to take such portions of food as serve them for the support of the whole, or greater part of the day. This frivolous argument, however, will not influence the determination of judicious persons, who value their health, and abhor gluttony. Hence we venture to recommend to those who are disposed to habits of temperance and frugality, but especially to the invalid and convalescent, instead of eating *one* hearty dinner in twenty-four hours, to divide the whole into *three* or *four* moderate meals, to be taken at intervals of four or five hours :—this arrangement will be more consistent with the rules of Nature and of Reason.

DISCOUNT, in commerce, a term employed by traders, merchants, and bankers; especially by the two former, when they purchase commodities on the usual time of credit, and on condition that the seller allow the buyer a certain discount at the rate of so much per cent. per annum, for the time during which credit is generally given; provided the buyer pay ready money for such commodities, instead of taking the usual time of credit.

Traders and merchants, also, who frequently take promissory notes for money due and payable to them or to their order at a certain date, and who sometimes have occasion for the money before the time elapses, procure these notes to be discounted by bankers before the time of payment, so that the latter deduct the interest which will become due by the time such notes are payable. Bills of Exchange are discounted by bankers on similar terms; which indeed constitute a considerable article of the profits of banking.—See INTEREST.

DISEASE, is that condition of the body, in which it has declined from a state of health, so that its different functions are either greatly impeded, or performed with difficulty.

Of all organized creatures, man is subject to the greatest diversity of diseases: some impairing only the use of the part immediately affected; for instance, the palsy, gout, rheumatism, &c.; others disordering the whole body, such as fever, apoplexy, &c.; again others disturbing the mind, as delirium, melancholy, and the like; and lastly, some attack both mind and body, such as phrenzy, accompanied with fever.

Without perplexing the reader with conjectures on the origin and propagation of diseases, we may observe, that in proportion as men associate together in large and populous places, their manners and habits become more refined; while they gradually degenerate in bodily strength, and energy of mind, so that they are less capable of resisting the noxious agency of the elements, and other external powers. This progress towards refinement is always attended with an increase of luxury, the painful effects of which are sooner or later experienced by its votaries. Luxury, indeed, has also afforded the means of lessening the sudden influence of cold, heat, rain, moisture, and other external causes; for we can occasionally guard against their severity; but, on their next return, we are liable to be acted upon with additional vehemence. To this state of things we owe the introduction of many articles, both of food and dress, the consequences of which too frequently prove to be injurious to our bodily welfare. Thus it may be safely affirmed, that the number and variety of diseases, in a great measure depend upon the prevailing refinements in the extensive department of luxury.

The passions are another fruitful source of disorders. Man is perhaps more violently attacked, and more obstinately governed, by them than any other creature. These emotions variously affect the human body: the most hurtful and oppressive of them, however, are *terror* and *grief*; the former in particular is often attended with the most fatal effects. The remedies to which we resort during the prevalence of passion, too frequently lay the foundation of lingering disorders both mental and corporeal, in which medicine can afford but precarious relief.

The last source of diseases to which we shall allude, is a variety of specific contagions; the greater part of which is probably generated in the atmosphere. Such is particularly the case with respect to air that is vitiated by putrid, marshy, or noxious vapours, and by the unwholesome effluvia of various manufacturing processes, especially those of combustion, fermentation, and putrefaction. Lastly, there is another and very numerous class of contagious maladies, that perpetually migrate from one individual to another, such as the small-pox, measles, hooping-cough, influenza, putrid fevers, &c. of which we shall treat in their alphabetical places.—See also CONTAGION and INFECTION.

Every disease weakens the digestive powers. The diet ought therefore in all cases to be light and easy of digestion. Paying due attention to this circumstance alone, without having recourse to those pernicious nostrums and pretended specifics, now in general circulation, will in a very great measure contribute to the recovery of the patient. Medicines are doubtless of considerable utility, when properly and opportunely administered; but an *indiscriminate* use of drugs (such as prevails among the ignorant and fanciful), cannot fail to be productive of the the worst consequences. See CHRONICAL DISEASES, vol. i. p. 521, and foll.

DISEASES OF PLANTS are divided by TOURNEFORT into the following classes: 1. Those which arise from too great an abundance of sap; 2. From having too little; 3. From its bad qualities; 4. From its unequal distribution; and 5. From external accidents.

An abundance of sap causes plants to vegetate so luxuriantly, that they seldom arrive at the requisite degree of perfection. Wheat is in some climates subject to a disease of this nature, in consequence of excessive vegetation, without producing ripe grain. Such a defect may likewise be artificially induced, by planting any species of corn in too rich a soil:—too much rain will be attended with a similar effect. When a vegetable is supplied too abundantly with juices, it is very apt to rot; one part of it overshadowing the other, so as to prevent the access of fresh air, for want of which it prematurely undergoes putrefaction. In grasses, however (fescue excepted), or in any herbaceous plant, too great luxuriance, so far from being a disease, is a very desirable property. According to Dr. HOME (" *Principles of Agriculture and Vegetation*") dung is a great preventive of diseases, arising from abundant moisture. The want of nourishment in plants may be easily ascertained by their decay; in which case the only remedy is, to remove from their vicinity such vegetables (and particularly weeds), as impede the growth of those we are desirous to cultivate.

The bad qualities, or unequal distribution of the juices of plants, occasion but few diseases which affect vegetables in this country, so that they are principally liable to external accidents, especially to the depredations of insects, such as snails, caterpillars, grubs and flies, to which we refer. — See also BEETLE, CHAFER, CRAB, and CORN-FLY.

The diseases which our gardeners chiefly observe, are:

1. *Barrenness*; when the tree, though apparently fresh and healthy, bears no blossoms; or, if it produce any, they soon fall; or, should they *set*, the fruit drops, before it arrives at maturity.

2. *Blasting of the buds*, occasioned by a frost happening while the leaves and blossoms are wet; in consequence of which the pores are contracted, and the vital juices obstructed: thus, if the sun begins to shine suddenly, they turn yellow, producing round fiery specks, whence frequently proceed tumors somewhat similar to warts, which rot, and generate maggots. Mr. MORTIMER adds, that the want of rain, during the *blossoming time*, often disposes the blossoms to drop, from a deficiency of sap; to prevent which, he recommends frequent watering.

3. *Blight*;

4. *Mildew*;

5. *Moss*; to which articles we refer.

6. *Rotten roots*; an incurable disease, occasioned by setting the plants too deep.

7. A kind of *mildew* arising from a thick fog, or too abundant dew; which, however, affects the plants only in a slight degree.

8. *Falling of the leaves*, caused by the trees sprouting too early, or when they are attacked by too sudden heat or cold.

9. The *Scurf* or *Leprosy*, a disease which is confined to the bark, and is produced by excessive dilatation of the pores, through which too great a proportion of perspirable matter exudes; so that by adhering to, and hardening on the bark, it causes the latter to chap and crack, while it obstructs all perspiration. Thus, the viscous rind or skin furnishes a secure retreat for vermin, which live both on the bark and on the tree.

To the various dieases should be added the injury done to trees by deer, hares, and rabbits, barking them. The best defence against the first of those animals, is to *pale* them round, or to paint the lower part of the tree; but the former method is preferable. Hares and rabbits may be kept off by tying bands of straw round the trunk of every tree, as far as they can reach. Some persons make use of a composition of tar and lime, which certainly is not less injurious to the growth of trees than the depredations of hares or rabbits. In general, where any defence is requisite, straw-bands afford a tolerable security.

DISTEMPER is frequently used in the same sense as disease, but is particularly applicable to *cattle*.— This term implies a species of contagious fever, attended with an inflammation, which is succeeded by a gangrene in the lungs, liver, or intestines. It is always preceded by a shivering and trembling of the limbs, which are followed by various febrile symptoms, such as difficulty of breathing, a sinking in the flanks, and a dryness on the tongue, together with a loathing of the usual food and drink, great heaviness and debility. Animals affected with the distemper, frequently shed tears; their eyes appear sometimes sparkling and inflamed, but at intervals dull and languid. Their food remains crude in the stomach for several days after it has been eaten, from their inability to digest it.

This contagion spread most rapidly in the early part, and about the middle of last century, over several provinces in France, whence it reached this country, and destroyed great numbers of cattle. Various causes of this malady have been assigned, but that most generally admitted, is the turning of cattle into rank grass, especially after heavy and frequent showers. Different remedies were then adopted, the best of which appears to be bleeding the infected animal in the earlier stages of the disorder; and the internal use of the Peruvian bark and red wine; or, if these should fail to procure relief, a mixture of that drug and of burdock, about half an ounce of each, pulverized, may be given twice nightly, for two or three succeeding nights, in warm water, which will seldom fail of effecting a cure.—Tar-water, consisting of one quart of tar and four of water, has likewise been administered with considerable success, in the proportion of three quarts or a gallon, according to the size of the animal. Such a dose ought to be given four times every day, but should be gradually lessened, so that the infected creature never receive less than three pints, or two quarts. At the same time it should be carefully housed every night, for several weeks, and the tar-water worked off with warm gruel and malt-mash.

When the pasture is very exuberant, it will be necessary to give purgatives to cattle, especially to cows; as such precaution will most effectually prevent the spreading of this fatal disorder. Hence a correspondent in the *Gent. Mag.* for 1745, judiciously advises large draughts of butter-milk to be allowed, till they are sufficiently purged.

Should, unfortunately, the distemper at any future time become so prevalent as it was in the last century, we would recommend the following directions (extracted from the 358th N°. of the *Philosophical Transactions*, for 1714) to be strictly attended to: 1. Those cow-keepers, whose cattle are well, ought not to approach any cows that are sick, nor permit any person who has been with sick cows to come in contact with their own. 2. That not more than ten or twelve cows be kept in a field together (or a still smaller number, if possible); it having been found by experience, that where the disease prevailed among herds of several hundreds, very few escaped. 3. When a cow-keeper perceives any one of his cows to be infected, he ought to kill her immediately, before the disease can arrive at any height; such being the only means of preserving the others. 4. All those cows which have been so killed, or happen to die of the disease, ought to be immediately buried with their hides, entirely covered with quick-lime, and afterwards with earth, *not less than six feet deep*. 5. The milking-places and fields where such sick cows have stood or grazed, should be kept clear for two months (or till they have been sufficiently cleansed by rain) before any other cattle be suffered to stand or graze there. 6. The house in which those cows have been kept, ought to be washed very clean, and then smoked, by burning pitch, tar, or wormwood; and to be shut up for three months, at least, before any other cows are housed in them: and 7. That the same method be taken with calves, oxen, and bulls.—See also MURRAIN.

DISTILLING, or DISTILLATION, the art of separating or drawing off the spirituous, watery, oily, or saline particles of a mashed body from the grosser and more earthy parts, by the aid of fire; then collecting and condensing them by the application of cold.

This process is generally performed by means of heat raised to a greater or less degree, as circumstances may require. The fire is either applied immediately to the vessels in which the substances are to be distilled, or mediately, by means of water, sand, iron-filings, &c.

The method of distilling at present uniformly adopted, is that by *ascent*, or raising the spirit above the fire; which again is called either *right* or *oblique*. The former process is managed with a common *alembic*, in which the liquor is raised, and then descends or drops into a receiver. This is chiefly used when the nature and consistence of the mash is such, as to admit of a direct ascent; for instance, in vegetables.

Oblique distillation is performed laterally and in crooked vessels, termed *retorts*. It is employed in distilling those more solid bodies, the particles of which are too heavy to be raised to the top of a common still, or alembic; of this description are salts, and fossils in general.

With respect to the practical part of distilling or refining, we shall first observe, that *the heat should in all cases be as gentle and uniform as possible.* Accidents may be effectually prevented by employing a worm of a proper width, and by rectifying spirits in a *water-bath*; which, if sufficiently large, will perform the operation with all the dispatch requisite for the most extensive business. The vessel in which the rectification is effected, ought to be immersed in another filled with water up to the neck, and loaded with lead at the bottom, in order to keep it firm and steady. The process will thus be managed as expeditiously as if the vessel were placed over an open fire, and without the apprehension of being disappointed; nor will it be necessary at any time to raise the water in the bath to a boiling heat.

A patent was granted in July 1773, to Mr. THO. DANFORTH, of Charlestown, in the Province of Massachusset's Bay, for his invention of a method of condensing the vapour arising in distillation: as the term of his privilege is now expired, we insert the following particulars. The whole improvement consists in making the worm-vessel, or that containing the water to cool the worm, or vessel which receives the steam or vapour to be condensed (whether the steam-vessel be a worm, strait tube, or of any other form), so that it may act in a manner similar to a syphon or crane; and, upon the same principles, by making it air-tight; excepting a communication by a tube or part of the vessel itself, with the water that supplies it, and an aperture from a tube or part of the vessel, below the horizontal level of the surface in the reservoir where it first enters; in order that the water may escape in the same proportion of time and quantity, as it flows into the vessel from the reservoir.

Another patent was obtained, in February 1797, by Mr. JOHN FALCONER ATLEE, of Wandsworth, Surrey, distiller, for his invention of an improved method of condensing and cooling spirits in the process of distillation, by means of machinery, not hitherto used for that purpose; but as this complicated process does not relate immediately to domestic economy, we refer the reader to the 7th vol. of the *Repertory of Arts and Manufactures.*

In the distillation of compound spirits, such as clove, lemon, citron-water, and the like, the process in no respect varies from that adopted in distilling brandy, &c.; much, however, depends on the practical attention paid to the following general rules: 1. The distiller of such liquors must be careful always to employ a pure, rectified spirit, or one freed from its own essential oil. For, as compound water consists of a spirit impregnated with the essential oil of the ingredients, it is requisite that this spirit should have deposited its own oily particles. 2. Let the time of previous digestion be proportioned to the tenacity of the ingredients, or the weight of their oil. 3. Let the strength of the fire also be adequate to the weight of the oil intended to be raised with the spirit. 4. Let only a due proportion of the finest particles of the essential oil be united with the spirit; as the grosser and less fragrant parts of such oil impart to it an unpleasant taste. This object may in a great measure be effected, by leaving out the *faints*, and, instead of them, *making up to proof* with soft water.

If the above-stated rules were carefully attended to, this branch of distillation might be rendered more perfect than it is at present. Nor would there be any occasion for using burnt alum, isinglass, whites of eggs, &c. to *fine down* cordial waters, which, by the process suggested, may be rendered clear, sweet, and of a pleasant flavour, without any farther trouble.

For the information of those who are unacquainted with this process, we shall here subjoin a few directions for making a few of such compound waters or spirits as are in more general estimation.

1. *Clove-water:* Take 4 lbs. of bruised cloves, half a pound of pimento, or all-spice, and 16 gals. of proof spirit. Digest the mixture in a gentle heat, and then draw off fifteen gallons, with a somewhat brisk fire. The water may be coloured red, either by a strong tincture of cochineal, or of corn-poppy flowers; and sweetened at pleasure with double-refined sugar.

2. *Lemon-water:* Take of dried lemon-peel 4 lbs.; pure proof spirit, 10½ gals. and one of water; draw off ten gallons by a gentle fire, and dulcify the compound with fine sugar.

3. *Citron-water:* Take of the dry yellow rinds of citrons, 3 lbs.; of orange peel, 2 lbs.; bruised nutmegs, three-fourths of a pound; clean proof spirit, 10½ gals. and one of water. Digest them in a moderate heat; then draw off ten

gallons, and add the requisite proportion of fine sugar.

4. *Orange-water:* Take of the yellow part of fresh orange-peel, 5lbs.; clean proof spirit, 10 gallons and a half; water, 2 gallons; and draw off ten, over a slow fire.

5. Ratifia, which see.

6. Usquebaugh, to which we refer.

By the 2 Geo. III. c. 5, and 14 Geo. III. c. 73, no distillers, or those who distil spirits for sale, are allowed to have any still, or number of stills, which, either singly or together, contain less than 100 gallons, under the penalty of 100l.; and the wash-still is to hold at least 400 gallons, exclusive of the head, under a similar penalty.

By the 8 and 9 William III. c. 19, and 24 George III. c. 40, all distillers are to enter their warehouses, stills, and vessels, &c. at the next office of excise, on pain of 20l.; and all such persons as occupy the same, if not entered, shall forfeit 50l., and the vessels are to be marked by the gauger.

Distillers, who use private pipes, &c. for the conveying of distilled liquor, incur a forfeiture of 100l. by the 10 and 11 Will. III. c. 4. They are also enjoined by the 12 Geo. III. c. 46, and 14 Geo. III. c. 73, to make holes in the breast of the still, for taking gauges and samples; and also to provide locks on the still-heads, the holes, discharge-cocks, and furnace doors, under a penalty of 50l. and of 200l. in case such lock or fastening be broken, or wilfully damaged, after it has been secured by the proper officer.

Distillers are farther required, by the 24 Geo. II. c. 40; 12 Geo. III. c. 46, and the 14 Geo. III. c. 73, to give notice to the officer of excise, before they receive any wine, cyder, &c. or any kind of fermented wash, on pain of 50l.; and also before they charge or open the still, expressing and describing the marks and numbers of the wash-batches used: and they are prohibited from charging the still with any other, under the penalty of 100l.

For an account of the different duties and penalties imposed on British spirits, we refer to the article Spirits.—The curious reader will also find many ingenious and useful hints in Mr. Cooper's "*Complete System of Distillation.*"

DISTORTION is that irregular growth, or unnatural motion, by which any part of animal bodies becomes deformed. Although this term is generally used to express an uncouth contraction of one side of the mouth, yet in this place we shall treat chiefly of those distortions of the bones which proceed either from external injuries, or diseased constitutions, such as a morbid state of the bones, contracted muscles, &c. This affection most frequently appears in ricketty or scrophulous children, or adults of a very delicate and debilitated frame.

Distortions of the spine often arise in consequence of continuing too long in any particular posture; a circumstance which ought to be attended to from the very commencement of the complaint.—Hence the patient should be accustomed *gradually* to turn himself to the opposite side, and to sleep upon a firm hair mattress, where his body may lie on a more equal surface than in the effeminating feather-bed. At the same time, a nourishing and regular system of diet, sometimes the cool, at others the cold-bath, should be employed, conjointly with such strengthening remedies as are conformable to the nature of the case, and the constitution of the individual. By these means, the disease has in many instances been controlled in its progress; though a radical cure cannot always be effected.

Several machines and instruments have been invented by ingenious men, for removing distortions of the spine, by pressure; but as their application requires considerable skill and attention, we think it our duty to caution those, who may be obliged to resort to such expedients, against the pretensions of the illiterate. In many cases, however, where the patient was not too long neglected, the use of the common collar has been attended with advantage. There is another contrivance, called *spinal stays*, with certain machinery adapted to them, which was invented in France, and afterwards introduced into this country by the late Mr. P. JONES, who, on account of the improvements he made on this article, is generally considered as the original inventor. Still, therefore, great merit is due to that skilful man; and as his widow, for the benefit of her family, now conducts the business (No. 23, Charlotte-street, Bedford-square), and has been in the constant habit of personally attending on females, we venture to recommend her to the patronage of the public.

Causes similar to those before enumerated, also produce distortions of the limbs. As, however, this subject is more connected with the practice of surgery than that of domestic medicine, we decline the farther discussion of it; having already communicated a few appropriate remarks (see vol. i. p. 155), under the head of BANDY-LEGS.

DITCH, in agriculture, a common fence, or inclosure, in marshes or other wet lands, where hedges cannot be conveniently planted.

Ditches are generally allowed six feet in width at the side of broad highways, and five feet in commons. But those trenches dug at the foot of the bank on which the quick is raised, are in general only three feet wide at the top, one at the bottom, and two feet deep. Thus, each side acquires a slope, which is of great advantage: for, in ditches made perpendicular, the sides are continually washing down; and if cattle descend into a narrow-bottomed ditch, they have no room to turn themselves, so as to crop and injure the quick. Where a ditch is four feet wide, it should be two and a half deep; and if it consist of five in width, it ought to be three in depth; or if it be wider, the depth should be increased in proportion.

DITCHING, LAND: See LAND.

DITTANDER: See PEPPER-WORT.

DITTANY, the WHITE, or *Dictamnus Fraxinella*, L. an exotic perennial plant, growing in France, Germany, and Italy. Its thick pungent and bitter root, produces annually erect stalks, which bear loose spikes of white, red, and purple flowers, in June and July.

This plant may be easily propagated in gardens, either by seeds, or by dividing the roots; it is eminently calculated for ornamenting borders. In smell and taste, the leaves of the dittany resemble lemon-thyme, but possess a stronger aromatic flavour, as well as a greater degree of pungency: when fresh, they yield, on expression, a considerable

derable quantity of an excellent essential oil. The flower-cups exude a very pure and fragrant resin, which, if taken internally, is, according to BECHSTEIN, productive of diuretic effects. As these flowers exhale a considerable proportion of inflammable air, they ought not, in any large quantities, to be kept in dwelling rooms.

DIURETICS, a term applied to those medicines which increase the secretion of urine in the kidneys. Their operation consists in promoting the circulation of the blood towards the renal arteries, rendering that vital fluid more serous, and at the same time stimulating the secretory organs.

The use of diuretics, in general, is indicated by the following circumstances: 1. An interrupted or diminished discharge of urine: but, as this complaint may arise from a great diversity of causes, such as spasms, acrimony of the fluids, relaxation of the solids, plethora, &c. great circumspection is necessary in the choice of medicines properly adapted to the nature of the case. 2. A natural tendency of the constitution to evacuate the morbid matter of a particular disease, by this passage: the symptoms of which are, a frequent inclination to make water; a dark, turbid, and copious urine. 3. An earthy, alkaline, scorbutic quality of the fluids. 4. An abundance of aqueous humours in the body, in general; or an extravasation of them, in particular parts. 5. A local accumulation of impurities in the urinary passages.

On the contrary, *diuretics* should never be resorted to in the following cases: 1. In diabetes, or an immoderate and long-continued evacuation of urine. 2. When this fluid is mingled with blood. 3. In inflammations of the kidneys and bladder. 4. In violent spasms, when there is reason to apprehend that stones are confined, or other organic defects prevail, in the urinary canal. 5. In those profuse states of perspiration, termed *critical*. 6. When the patient's body is already deficient in aqueous humours.

In the same proportion as we make use of thin, diluent liquors, the quantity of urine may be either increased or diminished: frequent drinking of such watery beverage is, therefore, one of the mildest diuretic remedies. This effect may be considerably promoted by the addition of such substances as specifically act upon the kidneys. To this class belong all the mineral waters containing saline ingredients, as well as the juices of mild summer fruit mixed with water, and particularly the sap extracted from the birch-tree.

Those, who are under the influence of diuretic medicines, ought to observe a cool rather than a warm regimen; because heat promotes perspiration, and lessens the secretion of urine. During the use of such remedies, considerable benefit may be obtained by conjoining them with those articles of vegetable nutriment, which naturally operate on the kidneys. Of this kind are the tops of asparagus and hops, the sweet cicely, lettuce, parsley, celery, all the subacid fruit, such as cherries, currants, raspberries, strawberries, grapes, mulberries, apricots, peaches, &c.—Beside these, we possess various and more powerful diuretics among plants, for instance, the horse-radish, onions, and garlick, neither of which, however, ought to be indiscriminately taken. One of the most efficacious remedies of this description, is the expressed juice of the common radish *(Raphanus sativus,* L.) mixed with sugar to the consistence of a thin syrup, and taken in doses of one or two spoonfuls, every three or four hours, or oftener.

DOCK, or *Rumex,* L. a genus of perennial plants, comprising 39 species, of which eleven are natives; and of these the following are the principal:

1. The *crispus,* or Curled Dock, which is found in meadows, pastures, on road-sides, and in almost every cultivated soil: it flowers in the month of June or July; its erect stalk attains the height of three feet. In the county of Norfolk this plant vegetates most luxuriantly, and is the pest of clover fields, from which it is very difficult to be extirpated. It is refused by horses, cows, and goats.—According to Dr. WITHERING, the fresh roots of the curled dock, when bruised and made into an ointment, cure the itch; and its seeds have been given with success in cases of dysentery.--In Germany, a decoction of the root is employed by country people for the cure of the scab, and other eruptions in cattle. The whole plant has been advantageously used on the Continent, for tanning or currying leather.—In early spring, the leaves may be boiled like spinach; and the peasantry abroad frequently smoke them instead of common tobacco.—BECHSTEIN informs us, that the dried seeds afford flour and bread.

2. The *acutus,* or Sharp Dock, which is common in woods, hedges, on the sides of rivers, and roads, and is sometimes found in fields and meadows. Its stalk grows frequently six feet high; and the flowers appear in June or July. This plant is refused by cows and horses. The roots, however, are employed by dyers, and with the addition of alum and cream of tartar, give a variety of shades, from a straw-colour to a fine olive: they impart a beautiful deep green to cloths that have been previously dyed blue.—The whole plant has been recommended to tanners as an useful substitute for oak-bark.

3. The *aquaticus,* or Water Dock, growing in peat-marshes, wet ditches, pools, at the sides of rivers, and in shallow water. It flowers in July or August, and is succeeded by large seeds.—This plant affords a medicine of considerable efficacy, when applied externally as a wash for spongy, putrid gums; its roots, when pulverized, have been found excellent for cleaning the teeth. These roots are of a bitter, astringent taste, and have often been employed for the cure of scorbutic and cutaneous disorders, whether administered internally, or applied externally in ointments, cataplasms, lotions, or fomentations. Decoctions of the leaves are, likewise, an efficacious laxative, and have been taken with advantage in rheumatic pains, and chronical diseases, occasioned by costiveness, or by visceral obstructions.—The dose usually given, is a decoction of half an ounce of the fresh roots, or from one to two drams of them, in a dry state.

4. The *obtusifolius,* or Broad-leaved Dock, which grows among rubbish, in farm-yards, courts, parks, and at the sides of ditches: it flowers in the month of July or August. — Fallow-deer are extremely fond of this species, as well as of the sharp dock, and eat

them both with such avidity down to the root, that neither of them is found thriving in a park.

5. The *acetosus*, or Sorrel-dock: See Common Sorrel.

6. The *acetosella*: See Sheep's Sorrel.

All these species of the dock are but seldom cultivated; as they so easily multiply by their numerous seeds, that, where they are once admitted, they become very troublesome weeds, and their extirpation calls forth every exertion of the industrious farmer.

Dock-cresses: See Nipple-wort.

Docking: See Horses.

DODDER, or *Cuscuta*, L. a genus of plants, of which two species are natives:

1. The *Europœa*, or Greater Dodder, a very pernicious weed, that chiefly attaches itself to clover, hops, flax, nettles, and willows, and flowers in July or August. Its leaves are scarcely visible, and it ought to be timely extirpated, before the seeds become ripe.—The whole of this plant is bitter, and is eaten by cows, sheep, and hogs; but goats do not relish it, and horses totally refuse it.—In dyeing, it affords a pale reddish colour.

2. The *Epithymum*, or Lesser Dodder, which is common in corn-fields and heaths, but is found chiefly preying on thyme, whence it has received its name. It is in bloom from July to August. This plant is reputed to be aperient and cleansing, as well for curing the jaundice as cutaneous disorders, &c. In this country, however, it is seldom used, though, from its pungent aromatic taste, it may with advantage be substituted for many drugs that are now imported.

Both these species are plants of a most singular nature, being almost destitute of leaves, parasitical, creeping, and fixing themselves to whatever is next to them. They decay at the root, and are afterwards nourished by the plants which support them. As soon as the shoots have twined about an adjacent plant, they put forth from their inner surface several vesicles, or papillæ, which attach themselves to the rind or bark of the plant. By degrees, the longitudinal vessels of the stalk, which appear to have accompanied the vesicles, shoot from their extremities, and penetrate the softer plant, by dividing the vessels, and insinuating themselves into the tenderest parts of the stalk; and so intimately are they united with it, that it is much easier to break, than to disengage them.

Doe: See Deer.

DOG, or *Canis*, L. a genus of animals supposed to be originally natives of China, and consisting of more than thirty species, of which that most generally known is the *familiaris*, or domestic dog: this again produces several varieties.—See Blood-hound, Mastiff, Hound, Spaniel, Grey-hound, Terrier, &c.

Dogs are remarkable for their great docility, fidelity, and affection for their master. These useful creatures guard our houses, gardens, and cattle, with spirit and vigilance. By their assistance we are enabled to take both beasts and birds, and also to pursue game through the waters as well as over land; nay, the Norwegians render them also useful in fishing. In general, they live to the age of fourteen or fifteen years, and seldom survive twenty: the female breeds during the first year, and produces from six to twelve puppies, after a gestation of about nine weeks. Those of a small size bring forth five, four, and sometimes only two. The whelps are generally blind, and cannot open their eyes till the tenth or twelfth day. In the fourth month, they lose some of their teeth, which are soon succeeded by others.

The dog is an animal of quick motion, and remarkable for travelling long journies. He easily follows his master, whether on foot or on horse-back, for a whole day; and, when fatigued, does not sweat, but lolls out his tongue. It is peculiar to dogs, before they lie down, to run about in a circular direction, with a view to discover the most proper situation for rest. They sleep little, frequently starting, and seem to hear with more acuteness, than while awake.

Dogs possess the sense of smelling in a very high degree. They can trace their master by the smell of his feet in a church, or in the streets of a populous city. In a savage state they are of a fierce, cruel, and voracious disposition; but when civilized, and accustomed to live in the society of men, they acquire every endearing quality. Gentle, obedient, submissive, and faithful, they appear to have no other desire than to serve and protect their master.—These qualifications, added to their very great sagacity, justly claim the esteem of mankind. Accordingly, no animal is so much caressed or respected: in short, dogs are so tractable and so much disposed to please, that they assume the very air and temper of the family to which they belong.

With regard to the qualities of dogs, those reared in Britain are generally considered superior to the dogs bred in any foreign climate. Other nations of Europe uniformly acknowledge their superiority, by adopting English terms and names, while they thankfully receive the creatures as presents. It is remarkable, however, that almost every kind of British dogs greatly loses its excellence in foreign countries; and that no art whatever can prevent this degeneracy.

Proper management of dogs.—As these are, at all times, very valuable animals, it is matter of some importance to take care of their health. This depends much on their diet and lodging: the frequent cleaning of their kennels, and giving them fresh straw for their couch, are highly necessary; or, during the summer, deal-shavings may be substituted for straw, as the former will prevent the breeding of fleas. If they be rubbed with chalk, and brushed and combed once or twice a week, they will thrive much better: the chalk will clear their skin from all greasiness, and they will be less liable to the disorder called the *mange.*

Dogs are of a very hot nature; hence they should always be provided with clean water, that they may drink when thirsty. With respect to food, carrion is by no means proper for them, as it must hurt their sense of smelling, in which their excellence in a great measure consists. Barley-meal, the dross or grossest part of wheaten flour, or both mixed together with broth or skimmed milk, afford very wholsesome nourishment.—On account of the sanguine constitution of these animals, the greatest relief to them in summer is Couch-grass, or DOG'S-GRASS, to which we refer. Those who keep a complete kennel of dogs, should purposely cultivate this plant, in a place into which they may be turned every morning: here they will eagerly eat it, to relieve the disorder to which they are subject, and thus to cure the uncommon heat of their blood.

These animals are liable to various diseases; of which we shall mention only the following:

1. *Bites* and *stings*. If dogs are bitten by any venomous reptiles, such as snakes, vipers, &c. the blood should be squeezed out, and the part washed with salt and urine: a plaster composed of calamint, pounded in a mortar, and mixed with turpentine and yellow wax, till it acquire the consistence of a salve, should then be applied to the wound. A draught, consisting of an ounce of treacle dissolved in wine, if given to the animal affected, will greatly contribute to its recovery.

2. *Mange*, to which we refer.

3. *Poison*. If there be reason to suspect that a dog is poisoned with *nux vomica* (which is often employed for that purpose by warreners, and causes convulsive fits), the most effectual remedy is to make him swallow, without loss of time, a considerable quantity of common salt, dissolved in the smallest proportion of water: this simple remedy may be administered by opening his mouth, and placing a stick across, to prevent him from shutting it, while his throat is filled with the solution. Thus, by holding his mouth upwards, a sufficient dose may be introduced, both to purge and vomit him. As soon as the stomach is properly cleared by a free passage downward, some warm broth should be frequently given to relieve his extreme faintness, which otherwise might prove fatal.

4. *Worms*; a disorder, with which young dogs in particular are very frequently troubled. All bitter substances are so offensive and nauseous to worms, that they are often voided in consequence of the animals taking two or three common doses of aloes, in the course of a week. Should this remedy fail, an ounce of the powder of tin, mixed up with butter, may be given in three portions, which generally destroys the worms, together with their seed.

5. *Coughs* and *Colds*. Dogs are very subject to a cough, attended with extraordinary paroxysms of choaking, which is often the consequence of a cold. In this case, it will be necessary to bleed the animal affected, in small quantities; but if the disorder proceed from what is called the *distemper* in dogs, and they appear to be very low in spirits, blood-letting must not be attempted. Meat-broth, or milk-broth warmed, should then be the principal part of their diet, and the following medicine administered: Take flour of sulphur, cold drawn linseed oil, and salt-petre, of each one ounce; let them be well mixed together, and divided into four doses; one of which is to be taken every other day. Meanwhile, the creature affected should be furnished with plenty of clean straw to lie upon, and likewise swallow, at least, one spoonful of honey every day.

6. The *scab*, or *itch*, though a rare disease in dogs, is sometimes very obstinate: it may, however, be easily cured by an ointment

made of hog's lard and sulphur, with which a part of the back of the animal should be rubbed every day, and the application gradually extended, till the whole back, from head to tail, and at length all the affected parts, have been anointed. Thus, the requisite portion of sulphur, which is a specific in those cases, will be introduced into the system, both by absorption, and the constant licking of the diseased creature.

7. *Madness.* See BITE and HYDROPHOBIA.

DOGBERRY-TREE. See CORNEL-TREE.

DOG-FLY, or *Cynomia,* L. a genus of insects common in woods, and among bushes: they are particularly troublesome to dogs, and usually seize upon their ears; it is believed, that they can be prevented only by being killed.

These vermin sting very severely, and always raise a blister in the part they touch. They have no trunk, but are provided with two teeth similar to those of wasps, and on the whole, resemble the large flat black fly, which peculiarly molests cattle. Although we possess no evidence of experience, yet it may be rationally supposed, that anointing the neck and ears of animals, especially those of dogs, in very hot seasons, either with the juices or decoctions of bitter and resinous plants, would afford a good preventive. For this purpose, we would recommend the tops of the fir-tree, the leaves of the walnut and chesnut trees, those of the various species of dock, &c.

DOG'S-GRASS, or COUCH-GRASS, or Couch-wheat, *Triticum repens,* L. is an indigenous, perennial plant, which grows on arable lands: it is also frequently found near the sea-coast, and continues in flower from June to September.

This is an extremely troublesome weed, as every joint of its fibres will grow; and so very luxuriant is its vegetation, that a single small joint, when transplanted, has been found to cover a superficial square yard of land, in twelve months.—Various remedies have been tried to eradicate it; but the most successful is that of laying the land fallow, in a dry summer; and frequently harrowing it to draw out the roots: where this is carefully practised, the soil may be so completely cleared of them, in one summer, that the remaining roots will not materially injure the future crop. A still more effectual mode of extirpating them, is to sow on such land, only those vegetables which require the horse-hoeing culture; for, where the soil can be frequently stirred, or harrowed, that operation will considerably tend to clear it from the roots of this grass, and also of many other noxious weeds.

At Naples, the roots of the couch-grass are collected in large quantities, and sold in the market, as food for horses. They have also been successfully tried in Britain, for the same purpose; and may be safely substituted for oats; as horses prefer them to the latter. They possess a sweet taste, somewhat similar to that of liquorice; and, when dried and ground to meal, have in times of scarcity been converted into bread.—Cows, goats, and sheep, eat the leaves, which are also occasionally swallowed by dogs, instinctively to excite vomiting, and to cool their hot blood.

Decoctions of the roots of couch-grass are used in medicine, and reputed to be aperient, diuretic, and of considerable service against the stone in the bladder. The juice of the leaves and stalks was greatly esteemed by BOERHAAVE, who recommended it to be drunk in considerable quantities, by patients troubled with obstructions in the viscera; particularly in cases of scirrhous liver, and in the jaundice. Cattle frequently have indurated livers in the winter: hence they should, early in the spring, be turned out into this grass, which will effectually cure the disorder.

DOG's-MERCURY, or *Mercurialis perennis*, L. an indigenous plant, growing under hedges and in woods, in many parts of Britain. Its perennial root creeps in the ground; the stalks are single, and without branches, rising ten or twelve inches high, with rough leaves: these have their male flowers, growing in spikes upon plants different from those which produce seeds.

This vegetable is of a soporific and poisonous nature, both to man and brute. There are instances of persons who, by mistake, have eaten this plant like spinach, instead of *Chenopodium*, or English mercury, in consequence of which they never awaked from their mortal sleep. In the Isle of Skye, an infusion of it is sometimes taken to bring on a salivation.

RAY, relates the case of a man, his wife, and three children, who experienced highly deleterious effects from eating this herb fried with bacon. Notwithstanding its hurtful properties, sheep and goats feed on it, but cows and horses refuse it.

When the dog's-mercury has accidentally been eaten among culinary plants, the most effectual method of procuring relief, is a brisk emetic speedily administered; and after having evacuated the contents of the stomach, vinegar, lemon-juice, or other vegetable acids ought to be taken in copious draughts. But, when the poison has been discovered only after the lapse of several hours, small doses of camphor may be given, till medical assistance can be procured.—See also ANTIDOTES: vol. i. p. 75.

Lastly, the roots of the dog's-mercury afford, according to BECHSTEIN, a blue and crimson colour, both in dyeing and painting.

DOG-ROSE, the COMMON; WILD-BRIAR, or Hep-tree, *Rosa canina*, L. an indigenous plant, growing in woods and hedges: in the month of June it bears oval flowers, which are succeeded by red, egg-shaped berries.

The blossoms of this plant, when distilled, afford a pleasant perfumed water. The leaves of every species of the rose, but especially those of the dog-rose, are recommended as a substitute for tea: when dried and infused in boiling water, they yield a fine colour, a somewhat astringent taste, and a grateful odour.—Dr. GLEDITSCH observes, that the green rose-leaves of every species are useful in currying fine leather.

An infusion of the full-blown blossoms of all the roses, especially of the paler kinds, is purgative; but the petals of red roses, gathered and dried before they expand, become astringent. The bark of the dog-rose, according to M. SIEFERT, imparts to wool a dark brown colour, which was fixed in different specimens, by the usual ingredients; and on dropping into the dye a solution of alum, it changed into an azure blue. But he observes that, in all these experiments,

ments, the colours possessed little or no lustre.

The berries of this shrub are at present chiefly employed in Britain by the apothecary, for making the conserve of heps.—On account of its fine flavour, the pulp of these berries is likewise used by the house-wife, in the north of Europe, for the preparation of domestic wines, with the addition of sugar. In a dried state, this pulp affords a grateful and rich ingredient in sauces. But we conceive that still greater advantage may be derived from dog-berries, by submitting them to the processes of fermentation and subsequent distillation. From an experiment we carefully made last autumn, it appeared that one gallon of this fruit, without any admixture, but that of a little water, yielded about two pints of *first runnings*, which, after being distilled a second time, produced one pint of a very pure proof spirit.

DOG's-TAIL GRASS, the CRESTED, or *Cynosurus cristatus*, L. an indigenous perennial plant, which grows in dry pastures, on a moist clayey soil, and blows in July. Its leaves are shorter than those of any of the pasture grasses; but they grow closely together, in great abundance, and are very palatable to cattle, particularly to sheep.—BECHSTEIN affirms, that the latter animals grow remarkably fat by pasturing on the different species of dog's-tail grass; and that their flesh thence acquires a flavour peculiarly delicate. Hence this plant might be advantageously reared in fields designed for sheep-walks, but by no means as a meadow or hay-grass. Its straws are uncommonly hard and tough; and, as they shoot up at a season when the leaves of all other grasses are very plentiful, they are not cropped by cattle, but generally suffered to stand and perfect their seeds, which afford a scanty subsistence to pigeons, at a time when their food is scarce.

DOG'S-TONGUE:—See HOUND'S TONGUE.

DOG's-VIOLET, or *Viola canina*, an indigenous perennial plant, which thrives in shady places, heaths, and hedge-banks: it is in flower from April to June.—Sheep are very fond of this herb, and bees collect honey from its blossoms.—The roots, when dried and pulverized, are said to be an excellent vermifuge, and were formerly drunk in wine, as an approved remedy for the colic. On account of their supposed astringent and restorative properties, they are sometimes given in water, to cure children of the epilepsy.

DOG-WHEAT: See DOG'S-GRASS.

DOLPHIN, or *Delphinus phocæna*, L. a cetaceous fish, found in the German ocean, and also in the Mediterranean sea. It is covered with a smooth, but very tough and firm skin; its body is sometimes 8 feet long, and of a conical form, except its back, which is prominent. This fish has teeth in both jaws, and above its snout, or nose, is a pipe, through which it spouts the water, necessarily taken in with its food.

Dolphins often follow ships at sea, and seize upon whatever is thrown overboard, as they are extremely swift in swimming, and are able to live a considerable time out of water; though, for want of air, they can continue in it only for a very short period. Hence they are sometimes taken up in fishing-nets, suffocated by being forcibly kept under water.

These fish, when young, afford a platable dish: they were formerly considered a great delicacy; but are now little valued, except for the oil, which they yield in common with other cetaceous fish.

DOOR, in architecture, is a contrivance for securing an aperture in a wall, to admit persons to enter and leave a house or apartment.

The proportions of doors are, in general, regulated by those of the human frame. In capacious buildings, they ought always to be larger than in small ones; but they should in none be less than $6\frac{1}{2}$ feet high, so as to allow a tall person to pass through it erect: the width must not be less than 3 feet.

Architects give the following dimensious for doors: in small edifices, their breadth ought to be 4 or $4\frac{1}{2}$ feet; in those of a middle size, 5 or 6; in large buildings 7 or 8: in chambers of the first description, $3\frac{1}{2}$, $3\frac{3}{4}$, or 4 feet; of the second, 4 or $4\frac{1}{2}$ feet; and of the third, 5 or 6; in churches, 7 or 8; and in gates, 9, 10, or 12:—by these proportions the height of doors may be easily determined; excepting those designed for the gates of cities, which should be only four-fifths of their breadth.

Dove: See Pigeon.

Dove-cote: See Pigeon-house.

DOUGH, is flour fermented with yeast, or leaven, and kneaded into paste.

In some parts of this country, the dough is made by the hand, but in the more populous towns and cities, the process is generally performed with the naked feet; a practice which deserves severe censure, as it may be easily avoided by the introduction of a certain machine, employed for the same purpose in the public baking-houses of Genoa. The object of this machine is, to convert a large quantity of flour into dough, and to knead it as completely as may be necessary, with a considerable saving of time and labour.

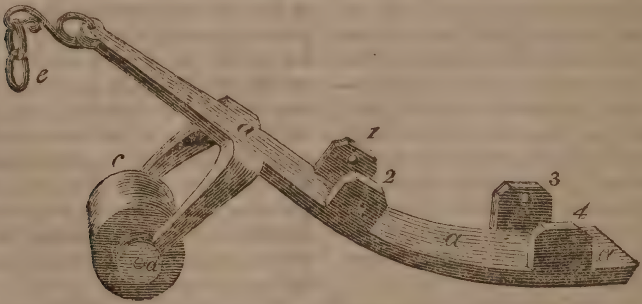
The machine consists of a frame or wall of wood, 14 palms (about $3\frac{1}{2}$ English feet) high, that supports an axis, 30 palms ($7\frac{1}{2}$ feet) long, and $1\frac{1}{3}$ palm (4 inches) thick; to which is joined a large wheel. In this wheel are steps, on which the men tread, turn it with great velocity, and thus impart motion to a cog-wheel that is fixed almost at the extremity of the axis, and acts upon various small pieces of machinery, or *beaters*, which communicate with a strong wooden tub, well hooped with iron. This tub will contain 18 *rubbi* of flour, which is carried to it in barrels, and mixed with leaven. As soon as the whole is tempered with a proper quantity of warm water, the wheel is turned round, by which the dough is expeditiously and completely kneaded. In general, a quarter of an hour is sufficient to make very good dough; but an experienced baker, who superintends the operation, determines whether it is to be continued for a few minutes, more or less, according to circumstances.

Those who think with us, that kneading the dough with naked feet, is a disgusting custom, and ought, without hesitation, to be abolished, will find a more copious description of the Italian machinery above mentioned, as well as a plate representing the whole apparatus, in the third volume of the *Repertory of the Arts and Manufactures.*—These improvements were sanctioned, and originally published, by the Patriotic Society of Milan, in their valuable *Transactions*; and we trust, that most of our bakers in the metropolis are sufficiently wealthy and intelligent to adopt the rational and *cleanly* practice here proposed.

DRAG, or Wheel-drag, an implement so constructed as to prevent the accidents which frequently happen to horses, when drawing loaded carts down steep hills or declivities.

In the year 1794, an instrument of this description, upon an improved principle, was invented by Mr. Joseph Kneebone, of Marazion, Cornwall, for which the Society for the Encouragement of Arts, &c. in 1795, conferred on him a bounty of twenty guineas.

This simple contrivance is, on the brow of the hill, applied to the near wheel, being fastened to the shaft by a chain, to prevent the wheel from passing over it, in case any great obstacles should occur in the road. It answers the purpose of taking off the increased weight, necessarily thrown on the shaft-horse's back when descending any declivities, so effectually that the deep ruts, or loose stones, which frequently occur in roads, do not in any degree impede the descent of the cart. Instead of a loaded carriage running on the heels of the shaft-horse, when descending hills, the drag, by supporting and elevating the wheel, places it on a level, so as to oblige the horse to draw a small burthen. In some instances, it is even necessary to link the chain-horse to the side next the wheel that is dragged; by which means, a weak horse may, without any risk or danger, be placed within the shafts. As soon as the cart arrives at the bottom of the hill, the drag is to be taken off, and secured in the manner hereafter to be described.



Description of the Cut of Mr. Joseph Kneebone's *Wheel-drag, for two-wheeled Carriages.*

a, a, a, A piece of wrought iron, curved to the exact form of a cart-wheel, with the thickest part at *b*, on which the weight of the cart rests.

1, 2, 3, 4, are shoulders, that keep the wheel within the drag, and should be about 4 inches high.

c, Is the wheel, made of solid

iron, which is nearly as wide as the drag, 7 inches in diameter; runs on its axis at *d*; has a strong shoulder; and, as it projects, resists the sudden jolts of rough roads. *e*, Is the chain to be fastened to the near shaft, in order to keep the drag properly under the wheel, which, from being violently jerked, might be apt to pass over the drag, and leave it behind: this is a necessary precaution, though seldom wanted, if the drag be well constructed.

In the shoulders marked 1, 2, are holes, by which the drag is suspended on hooks beneath the tail of the cart, when it is not employed.

This machine is, doubtless, susceptible of many improvements, especially in the size and construction of the wheel. By frequent use, the part to which the greatest pressure is applied, will necessarily wear away, and thus injure the drag: to prevent this accident, it ought to be shod, at first, with a plate of iron, or steel, fixed by means of two holes in its bottom; in which, when necessary, a similar piece may be inserted.

DRAGON's BLOOD, a foreign drug, more useful for staining than as a medicine.—See Marble.

DRAINING is the art or practice of making artificial channels, for carrying off superfluous moisture or water from wet or marshy lands.

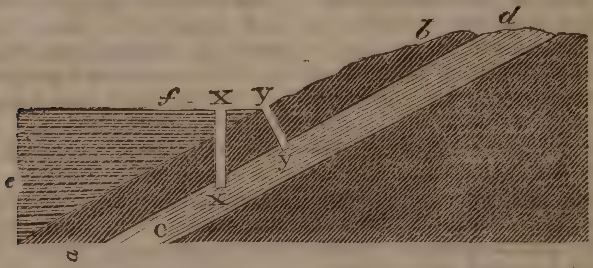
This highly useful art did not generally engage the attention of agriculturists, till about the middle of last century. It was formerly practised by persons, called *undertakers*, who received one-third of the drained land as a recompense. The advantages to be derived from their labours being obvious, several public-spirited men of talent have lately, with considerable success, investigated the subject; and with great exertions, not only rendered the most boggy and unfruitful soils firm and stable, but in many instances, so much improved their fertility, as to be productive of the finest grain.

Lands to be drained are usually divided into two classes: 1. *Uplands*, or those which are situated so high, that the water can descend from them, if properly collected and conducted; and, 2. *Fens*, *marshes*, or those lands which lie so low as to command no fall; have no descent; and some being even below the level of the sea.

I. With regard to *uplands*, it generally happens, that the waters from the springs beneath the soil are obstructed in their course to the neighbouring rivers. These springs originate from the atmospheric moisture; which, being condensed on the summits of hills into water, by the greater coldness of those parts, perforates the different strata of the incumbent soil, where it is of a porous nature; the water continues to descend, sometimes for many miles together, but generally from the nearest eminences into the adjoining valley, till its course is intercepted by a stratum of clay; where, being collected in considerable quantities, it is forced to work itself a passage through the porous strata of sand, gravel, or rock, that may be above the clay, following the course of these strata, till they approach the surface of the earth, or are interrupted by any obstacle, which causes the water to rise to the surface, and to form springs, bogs, marshes, &c.

At the foot of hills, therefore,

where the plain begins to be too moist, some augur-holes should be bored, in order to find the depth of the springs, and consequently the thickness of the upper stratum of the soil. If this be only 4 or 6 feet, an horizontal ditch should be cut along the bottom of the hill, to intercept the water, which ought to be carried off by one or more ditches communicating with the former, and conducting the water thus collected, into the neighbouring rivulet. Farther, as the strata, through which the water descends in forming these springs, have, with a few exceptions, the same inclination as the surface of the hill, the holes should be bored, and the ditch cut, not vertically downwards, as is commonly practised, but perpendicularly to that surface; a method which greatly facilitates the arriving at the second stratum: this will be more evident from the subjoined cut.



a, b, is the upper stratum, for instance, of marl; *c, d,* is the second stratum, of sand; *e, f,* represents the accumulated earth in the valley. It is designed to shew, that, in boring holes through the upper stratum, in order to find that beneath it, they should be formed perpendicularly to the side of the mountain, and not perpendicularly to the horizon, as by the former method the hole *y, y,* is rendered much shorter than that marked *x, x*.

If, nevertheless, on cutting a ditch five or six feet deep, along the foot of a hill, vertically to the rising plain, the upper stratum be not penetrated, and consequently no water ooze in to the bottom of the ditch, it will be expedient to bore other holes at the bed of such ditch, some yards deeper, or till water ascend through them. Where this succeeds, many holes should be made, and the water conducted into the adjacent brook, or river; for it will then rise, collect in those trenches six feet below the wet surface of the valley, and thus be carried off, instead of rising up from the lower *wall-springs*, or apertures of the stratum, through the incumbent soil, to the surface of the valley, which is so many feet higher.

This is the method which has been successfully practised, for several years, by Mr. ELKINGTON; but the *prior*, or at least *coeval*, discovery of which, is justly claimed by Dr. JAMES ANDERSON, who states (in the introduction to his ingenious "*Essays on Agriculture*," vol. iii.) that he sunk a hole with a wimble into the earth at the bottom of a ditch, in the year 1764; that the water rose six feet above the surface of the ground, and has continued flowing ever since, tho' with less rapidity.

These ditches should be made narrower as they descend, by spades of a proportionate size and breadth: but the lowest part ought to be contracted more than any other, so that the shoulders or edges of it may support stones or faggots, in order to cover the whole, at a small expence, without obstructing the currents of water. In many places, hollow-bricks, ridge-tiles, or old fragments of plastered floors, may be applied to the same purpose; as they may be substituted for stones, or faggots, and at a reduced expence.

Situations, however, frequently occur, where the first stratum of the earth may be too thick to be easily perforated; or where the water, condensed from the atmosphere on the summits of the hills, may work itself a passage between the second and third, or between the third and fourth strata, which form the sides of those hills, from a deficiency of so many of the strata at their summits. Hence the water lies too deep to be retarded in its progress by a ditch, or by boring; but, being dammed up by the materials that form the plain of the valley, it ascends through them to the surface, and thus forms boggy, or marshy ground. In such cases, the common mode of draining may be successfully employed: it consists in cutting several ditches four or six feet across the bog, or morass; and in covering them so that the water may not be obstructed in its passage, but be thus in part collected and conveyed away, though certainly with less advantage than where springs can be intercepted.

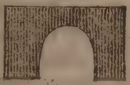
Another method of draining is, that of opening trenches, or drains, almost annually, by a large plough with two converging coulters, and other appropriate machinery, for the purpose of cutting both sides of a ditch at the same time, and turning out the intervening soil.—These large ploughs are still kept in some parishes, and drawn over moist commons, by twelve or twenty horses, so as to form parallel ditches.

An instrument was invented for this purpose by Mr. ADAM SCOTT, of Guildford, Surrey, called by him, a *mole-plough*, and for which the Society for the Encouragement of Arts, &c. in 1797, gave him a bounty of thirty guineas. It consists of a coulter, 15 inches in length, and $2\frac{1}{2}$ in width, to cut the sward. Behind this is applied an horizontal cone of cast iron, 20 inches long, and $2\frac{1}{2}$ in diameter at the base, to the middle of which is fixed an upright bar 2 feet long, and $3\frac{1}{2}$ inches broad, with a sharp edge. If this cone be drawn along moist lands, 6 or 8 inches beneath the turf, either in the spring or in autumn, in several parallel directions, the water will be conveyed away for a considerable space of time, without breaking the surface. With Mr. SCOTT's mole-plough, a man and boy with four horses may, with ease, drain thirty acres in a day; but, at the lower side of the ground intended to be drained, there should be made an open gripe or ditch, in order to receive the water from those small cavities which are formed by the plough, at the depth of 12 or 14 inches. In very moist lands, or in very wet seasons, if a larger number than six or eight horses be employed, their feet will not sink so deeply into the turf as each animal will draw less; should, however, the ground be so exceedingly soft as scarcely to support the cattle, that inconvenience may be obviated by fixing to the horse's feet broad wooden shoes, similar to the snow shoes made use of by the inhabitants of northern climates.—The price of this useful plough, when complete, does not exceed two guineas and a half.

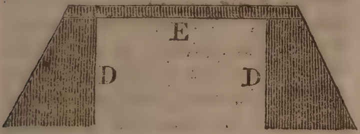
In October, 1797, a patent was granted to Mr. HARRY WATTS, of Binley, Warwick, for his invention of an implement, or machine, for draining land, which appears to be an improvement on Mr. SCOTT's mole-plough. The only material difference which subsists between them, is Mr. WATTS's application of a rolling cutter made of cast steel, or cast iron, in the beam of his implement, instead of the common coulter, which, in Mr. SCOTT's plough, is fastened in the usual manner, by wedges. The patentee has likewise added three cutters, which may occasionally be substituted for the rolling cutter or coulter above-mentioned. This implement requires from four to eight horses, which number may be increased, or diminished, according to the nature of the land, and the depth it is intended to be worked. But, before it is used, Mr. WATTS observes, that the land to be drained should be carefully examined, in order to ascertain the most convenient place for carrying off the water: hence the lowest end or side of the field must be selected for that purpose. The price of Mr. WATTS's machine, we understand, is not less than ten guineas.

The last method of draining uplands, of which we shall give an account, is that practised in the county of Berks. It consists in digging a trench 2 feet deep, one foot wide at the top, and 9 inches at the bottom, with a steep descent to a ditch, extending along the bottom of the grounds, and made of a proper width and depth, to receive and carry off the water. Within these trenches is formed a channel, the sides of which are composed of hard white chalk, cut nearly into the size of bricks; the whole is covered with pieces of the same material, and the crevices filled up with the chippings. The mouth of the channel, where the water falls into the ditch, is constructed with brick or flint, as chalk will not bear the frost, to which this part of the work must necessarily be exposed. On the top of the channel is placed a thin coat of wheat-straw, brambles, or any small brush-wood. The passage for the water will be somewhat more than 3 inches. In digging trenches of this kind, the workmen lay the best earth on one side by itself, in order to replace it on the surface, when the trenches are again filled up. But, in all cases, where land lies on a declivity, care should be taken, that the drains have an easy and gentle descent; for, if they have too rapid a fall, they are apt to burst, or excavate; and, their protection below being lost, the least pressure from above will consequently destroy the work.

II. With respect to the draining of those *plains* or *morasses*, where no fall can be procured, the water may, in many situations, be collected by cutting a long horizontal ditch above the level of the morass, so as to intercept all the wall-springs; and may then be carried off in wooden troughs, or hollow bricks, above the surface; and, if any water continue to penetrate the morass, it may be conducted to the extremity of the ground, either in open drains, or in covered brick drains, of which we have annexed the following cuts:



This figure represents a hollow brick, two of which, being placed one upon the other, form the pipe, which is chiefly useful for making small drains.



D, D, are two bricks placed opposite each other, and then covered with E, a stone on the top, in which situation they will form a large drain.—The mould pressing on the sides of the bricks, keeps them firm and steady: the turf taken off the soil, ought to be laid upon the stone, with the grass side downwards.

The draining of low moist lands may also be advantageously effected by a *roller* or *wheel*. This is made of cast-iron, weighs 4cwt. and is 4 feet in diameter: The cutting edge, or extreme circumference of the wheel, is half an inch thick, which, increasing in thickness towards the nave or centre, will cut a drain half an inch in width at the bottom, 4 inches wide at the top, and about 15 inches deep. This wheel is so placed in a frame, that it may be loaded at pleasure, in order to score out a greater or less depth, according to the resistance of the ground; which being thus cut during the winter, the wheel-tracks are either then filled with straw ropes, and lightly covered over, or left to crack wider and deeper, during the succeeding summer; when the fissures should be kept open with twisted straw and bushes, and lightly covered with such porous soil as can be most conveniently procured. Thus hollow drains may be formed upon grass or ley-land, at little expence, and will answer every useful purpose.

The necessity and utility of draining the surface-water from *clay soils*, in wet seasons, is generally acknowledged; but, excellent as the different methods are in the cases before mentioned, they do not appear to be so simple, or so effectual, as could be wished in the present. Covered drains frequently fail in producing the desired effect, in consequence of the covering materials being of too close a texture to admit the water to filtrate through them with sufficient freedom. Mole-ploughs, of the best construction, require such a number of horses to draw them, as must necessarily injure the soil, by *poaching* it. Farther, *covered drains* are not only dangerous to full-grown sheep and young lambs, but from the quantity of clay necessarily dug up, and spread over the richer surface-soil, they are also injurious to vegetation. None of the several modes of draining now in use, being subservient to the essential purpose of conducting large quantities of water from a deep soil, we feel satisfaction in communicating the following simple contrivance of Mr. JOHN MIDDLETON, just published in the 22d No. of the "*Commercial and Agricultural Magazine*." It consists merely in adding a piece of wood to the felly of a common six-inch cart-wheel, to which is prefixed a rim of iron, of a triangular form. The whole expence of this addition does not exceed one guinea. A wheel of this description, when put on the axle of a cart in the usual way, will of course rest on the edge of the triangular rim of iron above alluded to; and, on driving the horses forward, will make a small indent in the ground, merely by its own revolution. But, in order to press it down to the depth of six or eight inches, that side of the cart should be laden with stones, iron, or any other heavy material, until the whole of the rim, as well as the additional piece of wood, and the felly itself, if necessary, sink into the soil. The cart should then be drawn in such a direction that the cutting-wheel may revolve where the drains are intended to be formed. Sometimes it will be necessary to apply the indenting machine to every furrow; but, where the land is level, it should be drawn over it in parallel lines, five or ten yards apart. The wheel on the opposite end of the axle is a common six-inch wheel, which supports only the empty side of the cart, and consequently will not cut the ground.

The advantage of this contrivance, as stated by Mr. MIDDLETON, is, that it makes an indent in the soil sufficient to carry off the water during the ensuing winter, by pressing down the herbage, without destroying it. In the succeeding spring, these drains will be nearly grown up, so that there is no injury done to the grass. He observes, however, that this wheel should be drawn over the ground every year, on the approach of winter; but so easy is its application, that by means of it, and two old horses, one stout boy, or man, may drain from *ten* to *twenty* acres in *eight* hours.

The first oject in draining a bog or marsh, is, to discover the lowest spot of dry ground that surrounds it, in order to open on that part the main trench which is to carry off the water: if there be the least appearance of any stream, it should be traced with care; for this will point out the proper spot on which to begin. The main trench, commencing at the lowest part, may be carried to whatever distance it is thought proper: if it begin at the right spot, 10 acres may be detached from the marsh, however extensive, and completely drained; but, if the drainage be not begun where there is a sufficient fall, the labour bestowed will be to no purpose: the main cut or trench should be 10 feet broad in the clear, with a proper slope, to prevent the sides from falling in, and filling it up.

Bogs are divided into two sorts, *black* and *red*.—The former are solid, and make excellent fuel for common fires, or for burning lime; but the red bog consists of a loose, porous, fungous mass, which burns badly, and yields no ashes. Hence, in black bogs only, the drains ought to be cut into turfs, dried, carted, and piled.

As the main canal advances, small ones may be conducted into it on either side, inclosing such spots of ground as are intended to be improved. No certain rule can be laid down for the depth of drains; yet we apprehend the prevailing practice of cutting them down to the solid ground beneath the bog, is founded on the erroneous principle, that such depth is sufficient as will leave the surface dry. Numerous drains, however, being always useful and necessary, the spots inclosed ought not to contain more than five acres; but in such space it is requisite that several cross-cuts be made, which should be 4 feet broad at the top, and 3 feet deep. A whole year will be requisite to complete these drains; and, in the ensuing spring, it will be necessary to open, deepen, and clear them of the adventitious boggy matter; a work which should be occasionally renewed. The second year may be employed in extending the main trench; in taking in fresh inclosures by new lateral cuts; and in draining these by means of small transverse drains. Although this annual deepening and clearing of marshy grounds be attended with great labour and expence, yet the operation is thus progressively completed, and in succeeding years both trouble and costs will be gradually diminished, in proportion as the bog subsides.

As soon as the drains have rendered the marshes sufficiently firm for oxen to walk on them, the heaviest rollers that can be procured should be employed, to act by repeated pressure. Indeed, without a considerable degree of such pressure, during the first year, no bog can be effectually consolidated. An alternate draining and rolling, annually (the drains being still kept open), would, probably, contribute much to the destruction of weeds. Previous to rolling in the spring, it has been strongly recommended to sow every kind of grass-seeds, indiscriminately, such as ray-grass, hay-seed, clover, &c.

An instance of uncommon and successful industry occurs in the 18th vol. of the "*Transactions of the Society for the Encouragement of Arts,*" &c. which in the year 1800 conferred a gold medal on JOHN MOREHOUSE, Esq. of Brownslade, in the county of Pembroke, for improving 274 acres of waste moor-lands, which were formerly a common, and so completely inundated as to be of no value whatever.

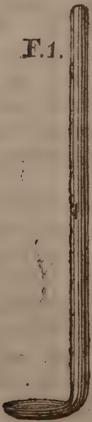
Before we conclude this subject, we think it necessary to give some account of *stone drains*, which are calculated for soils where the common methods of draining cannot be adopted. Such drains ought to be cut 10 or 12 inches wide, with perpendicular sides; and flat stones should be so placed, as to leave a water-course at the bottom, by setting two stones triangularly to meet at the points. Or, the bottom may be covered with a flat stone, and three others placed upright, and the water left to work itself a passage between them. In either case, the cavity of the drain ought to be filled nearly up to the top with loose stones: screened or washed gravel, where it is found in greater abundance, has been successfully substituted. Those pebbles, however, which are often found on the sea-shores, are well adapted for filling drains; as, being smooth, and generally round, the water flows through them more freely.

The principal drains ought to be 3 feet deep, and 18 inches in width; the bottom and top should be laid with flag-stones; the sides built up to a sufficient height with common stones; and the whole covered with sods of turf, but the grassy sides downwards: these again are to be overspread with earth, sufficient to admit the plough. The smaller drains are, in general, to be conducted at an acute angle into the main trenches.

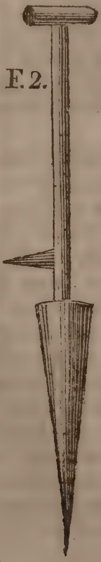
Lastly, *sod* or *earth-drains* are usually dug two feet deep with a spade, when the soil is taken out by an instrument, or scoop, about four inches wide, and the drain covered with the sods first dug out, if the ground be firm enough to support them; or, some blackthorns are put in, in order to bear the weight of the sods. Those drains which have the smallest passage for the water at the bottom, are reputed to be the most durable; as the force of the water has been found sufficient to clear away any small obstacles accidentally obstructing its course.

Common earth-drains are sometimes dug two or three spits deep, with a broad spade, the bottom is taken out with a narrow one, and filled with stones.—Sometimes a furrow is drawn with a plough, and cleared by a common spade: the draining instrument *Fig.* 1, is then introduced to the depth of 18 inches from the surface; and, after taking out the loose mould with the scoop *Fig.* 2, black-thorn bushes, or heath, which is still better, are carefully laid along the bottom, covered with strong wheat-straw, twisted to the thickness of a man's leg; and the whole is then carefully closed in.

F.1.



F. 2.



Hollow drains, without stones, have been tried on stiff lands: they are made narrow at the bottom, and covered half way up with sods, or square pieces of the surface-sward, resting on ledges cut for that purpose.

It is much to be lamented, that we possess, in this cold climate, no grain similar to *rice*, that would grow in watery grounds which cannot be drained, nor indeed any esculent roots or foliage, except water-cresses. In such situations, some plants may perhaps be cultivated with profit to the proprietor, as the *Festuca fluitans*, or Floating Fescue; *Callitriche*, or Star-grass, or Star-wort; to which may be added the *Orchis*, for the purpose of making salep, by drying the peeled roots in an oven. If these plants should not completely succeed, other vegetables of quick growth may be raised for manures, such as the *Typha*, or Cat's-tail; the *Caltha*, or Marsh-marigold, &c.; which should be mown twice a year, while they are young, and abound with saccharine and mucilaginous matter, ready to pass into fermentation.

It frequently happens that, notwithstanding all the labour and expence which the industrious cultivator may bestow on the construction of drains, his lands become, in the course of time, soft and wet, so that they gradually return to their former state. This unfavourable change is often occasioned by the *Equisetum palustre*, or Marsh Horse-tail, a plant growing on swampy ground, which has been found vegetating *within* the drains, to a very considerable extent, and thus, at first intercepting or obstructing the course of the water, then gradually weakening the current, and at length wholly choaking up the drain. The only remedy yet known is, in the opinion of Sir JOSEPH BANKS, to cast the under drains into open ones, as soon as this evil can be ascertained.

Those who wish to acquire more minute information on this subject, we must refer to Dr. ANDERSON's excellent "*Practical Treatise on draining Bogs and swampy grounds*," (8vo. pp. 308, 6s. boards. Robinsons, 1797): and to Mr. JOHNSTONE's "*Account of the most approved Mode of Draining Land*," &c. (4to. 1l. 5s.) in which it is amply investigated.—See also PONDS, with a Plate.

DRANK. See DARNEL.

DRAUGHT, in trade, is a small allowance on all goods capable of being weighed, and which is made by the King to the importer, or by the seller to the buyer, so that the weight may not be deficient, when the goods are weighed again.—Thus the King allows one pound draught for goods, that weigh not less than 1 cwt.; 2 lbs. for such as weigh between 1 and 2 cwt; 3 lbs. for those that weigh between 2 and 3 cwt.; 4 lbs. from 3 to 10 cwt.; 7 lbs. from 10 to 18 cwt.; 9 lbs. from 18 to 30 cwt. and upwards.

DRAUGHT, or *Draft*, is also sometimes used for a bill of exchange, but generally for an order on a banker, or trader, for the payment of any sum of money that may be due, &c.; in which case the person who gives the order is said to *draw* upon the other.

DRAUGHT, in Rural Economy: See HORSES and OXEN.

DRAWBACK, in commerce, generally signifies certain duties, either of the customs, or excise, which are allowed upon some of our own manufactures; or upon certain foreign merchandizes, for which the duty has been paid when they were imported.

By the 2d and 3d ANN, c. 9, the oaths of the merchants importing and exporting, are required, in order to obtain the drawback on foreign goods, affirming the truth of the officer's certificate on the entry and payment of the duties. Such oaths are permitted by the statute to be made by the agent or husband of any corporation or company; or by the known servant of any merchant, who is usually employed in making the entries, and paying the customs.

With respect to foreign goods entered outwards, by the 13th and 14th CAR. II. c. 2, and 8th ANN, c. 13; if such goods be fraudulently shipped out in a less quantity or value than is expressed in the exporter's certificate, the goods mentioned in the latter, or their value, are forfeited: and no drawback will be allowed for them. By the same statutes, foreign goods exported by certificate, in order to obtain the drawback, but which goods are not shipped or exported, or are re-landed in Great Britain (unless in case of distress, to save them from perishing), are to lose the benefit of the drawback, and are forfeited, or their value, together with the vessel, horses, carriages, &c. employed in re-landing such goods; and the persons employed in re-landing the same, or by whose privity or connivance they are re-landed; or into whose hands they shall knowingly come, are to forfeit double the amount of the drawback.

By the 8th Ann, c. 13, officers of the customs, who connive at, or assist in any fraud relative to certificate-goods, besides incurring the penalties therein mentioned, are to forfeit their office, and be imprisoned for six months without bail; similar penalties are inflicted on the masters or persons belonging to ships, detected in such unlawful practices.

DRAW-NET, a kind of net for taking the larger species of wild fowl: it ought to be made of the best packthread, with wide meshes; the whole should be about two fathoms in depth, and six in length; verged on either side with a very strong cord, and stretched at each end on long poles.

Draw-nets must be spread smooth and flat on the ground, and strewed over with sedge, grass, &c. to conceal them from the fowl. The sportsman should likewise shelter himself in an arbour covered with the boughs of trees, grass, fern, or other vegetables, in order to prevent his being discovered.—See also Bird-catching, vol. i. p. 261, and foll.

DRILLING, in husbandry, a method of sowing grain or seed of any kind, so that it may be deposited in the ground at an uniform depth; a circumstance of the utmost importance to the production of healthy and vigorous plants.

This method differs from the old, or broad-cast husbandry, which is performed by sowing the grain, or seed, with the hand; whereas the new practice is effected by one of the most useful machines ever invented, and called a *drill-plough*. It was originally introduced into this country about sixty years since, and at first violently opposed as an useless innovation, till it was proved, by repeated experiments, to be indisputably the best mode of sowing hitherto contrived.—See Broad-cast, vol. i. p. 359.

By the broad-cast system of culture, the land is often sown in bad tilth, the seed is always scattered at random, and sometimes by very unskilful hands. In drilling, the ground must be in good order; and the seed set in trenches regularly drawn, all being nearly of an equal depth, which is adapted to the nature of each particular kind of seed. These seeds are also distributed at proper distances; and, by being equally and speedily covered, are most effectually protected from vermin, and other accidental injury. Farther, in consequence of the broad-cast practice, the seed falls in many places too thick, in others too thin; and, being imperfectly covered, part of it is devoured by vermin which follow the sower; the remainder is exposed to rain or frost, or to heats, either of which are very hurtful. When harrowed in, a considerable portion of the seed is so deeply buried in the soil, that if the latter be wet, it putrifies before it can vegetate.

Besides, when corn is thus sown, the crop will not admit of being touched afterwards, because its growth is irregular. The soil cannot be broken in order to afford it more nourishment; nor can even the weeds be destroyed without much damage and inconvenience. On the contrary, in the drill-husbandry, the intervals between the rows, whether double or single, may be horse-hoed; and nourishment may thus be repeatedly given to the plants, and the weeds almost totally extirpated. Drilling, however, is not calculated for *every* soil; yet as there are but few situations,

tuations, in which the broad-cast method is preferable to it, they ought not by any means to impede the more general introduction of the former.

The drill-husbandry is said to be attended with many disadvantages: namely, 1. That it is very difficult to procure persons who are acquainted with the use of the drill-plough, or its proper management, when on the soil. 2. That the earth requires to be well prepared to admit of it. 3. That the crop is too thinly sown by it. 4. That drilled-crops are harvested later than broad-cast ones. 5. That clover does not succeed, when cultivated according to the drill-husbandry. 6. That oats produce rank and coarse straw, which does not afford wholesome food for cattle.

These objections appear formidable, and it must be allowed, that no person can acquire a thorough knowledge of the drill-husbandry in one season. It is nevertheless untrue, that the seed is too thinly sown; for, though the quantity required is nearly one half less (which is consequently saved), yet the crops of drilled wheat are, in general, so much more valuable than those of broad-cast, whether we consider the quantity, quality, or weight of the grain, that the inferiority of the latter is evident to every impartial observer. This reason is likewise a sufficient answer to the objection alledged against the expence of horse-hoeing, which eradicates almost every weed, even where hand-hoeing is impracticable; and consequently in a very considerable degree promotes vegetation.

To this we may add, that by drilling, the seed grows more regularly and vigorously; and that though the crops are harvested later than broad-cast ones, yet they are *gotten in* with less expence, and with greater safety, while the soil is left in a better state for future crops.

Such are the advantages and disadvantages attending the drill-husbandry, which we have endeavoured fairly to state: after these decisive proofs, no rational agriculturist will hesitate to pronounce in favour of the new system.

That useful instrument the *drill-plough*, was first introduced in this country by the ingenious JETHRO TULL, in the beginning of the last century. Since that period, various other machines, or drill-ploughs, have been invented by different persons, of which we shall mention the principal.

One of the earliest implements of this description is the *hand-drill*, which is chiefly employed in the low-lands of Scotland, where it was also invented. It is pushed along by two handles, in a manner similar to wheel-barrows, and sows one row at a time. The principal part of this machine is a wheel, about 22 inches in diameter, and made of solid deal, upon the axle of which is fixed a notched roller 2¼ inches in diameter, and 2 inches long, that turns in the fore-part of the drill-box. The quantity of seed intended to be sown, is regulated by a slider, which moves up and down in the fore-part of the box, by an adjusting screw fixed at the top; and has a strong brush, that projects from its lower end, and sweeps upon the notched roller. There is also a sluice, or slider, which lies flat on the bottom, on the inside of the drill-box, and juts out between the two handles of the

drill,

drill, so as to be within the reach of the person guiding it; who, by pushing the slide forwards, completely covers the notched roller, and prevents any of the seed from being scattered, while the drill is turning at the end of the ridges. With this implement, a woman, or boy, is able to drill from 2 to 2½ acres in a day; the rows being at the distance of 20 inches.

The next contrivance is that of the ingenious Mr. ARTHUR YOUNG, whose indefatigable labours in promoting agriculture, are too well known to require our encomium. In the common drill-ploughs, there are generally two or three barrels, with corresponding hoppers, or receptacles for seed, through which it is committed to the ground. Such an arrangement renders them necessarily complex; and to obviate the defect resulting from it, Mr. YOUNG has two divisions in the barrel, and two corresponding ones in the hopper, which are more simple, and doubtless preferable to moveable boards. In his drill-plough the whole machinery is fixed; yet he sows with it single rows at any distance, double ones at two feet, or three rows at one foot; relinquishing the other powers of mechanism, to render the plough in all its parts stronger, and more steady. It is likewise calculated for the stiffest soil; and Mr. YOUNG adds, that it will even deposit seed in drills cut through a clay field, without any previous ploughing. For a more detailed account of this excellent machine, we refer our readers to the 3d vol. of "*Annals of Agriculture*," p. 240, where it is fully described, and illustrated with an engraving. The expence of this implement, when complete, is about seven guineas and a half, if made of iron; if of wood, it may be estimated at four.

The next we shall describe, is the celebrated drill-plough invented by the Rev. JAMES COOKE, late of Heaton Norris, near Manchester, but now of Red Lion-square, London; for which he obtained a patent in, or prior to, the year 1784. Mr. C. has since made several improvements in, and additions to his machinery; in consequence of which a new patent was granted to him, about the year 1788.

Description of the Rev. Jas. Cooke's Patent Drill Machine simplified and improved, so that it may be converted into a Horse Hoe. (With a Copy of an accurate Engraving, approved of by the Author).

Fig. 1. A, A, are the shafts of the machine, applied to the axis of the wheels, so that the horse may walk in the furrow, without treading on the land, either for the purpose of drilling or horse-hoeing.

B, B, the wheels.

C, C, coulter-beam, with holes or mortices for the coulters, at different distances.

D, D, handles of the machine, applied to the coulter-beam, and also to the axis of the wheels, by hooks and eyes, or staples.

E, E, the upper seed-box, in partitions, covered by a lid, to protect the grain from wind or rain.

F, F, lower seed-box, in partitions.

G, G, slides between the upper and lower seed-boxes, for regulating the quantity of seed sown.

H, H, a cylinder with cups or ladles of different sizes, for various sorts of grain or seed, by which the latter are taken up and dropped into the funnels I, I, and conducted

Fig.4.

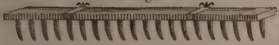


Fig.1.

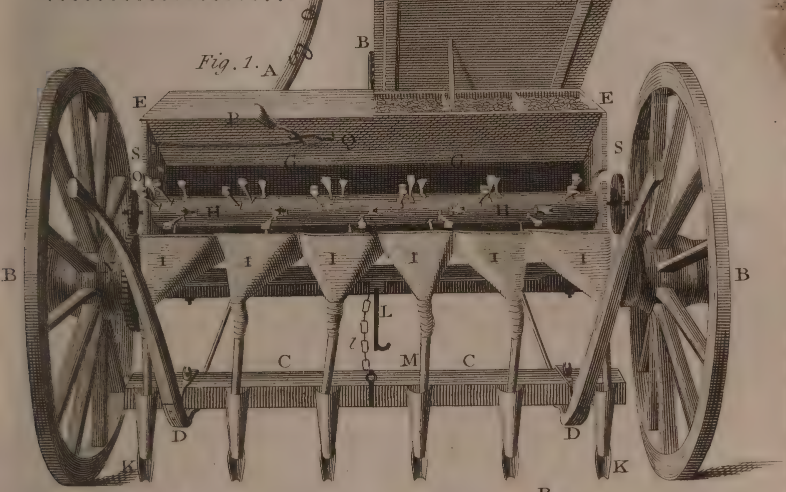


Fig.3.

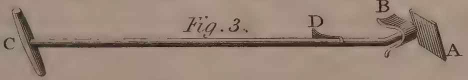
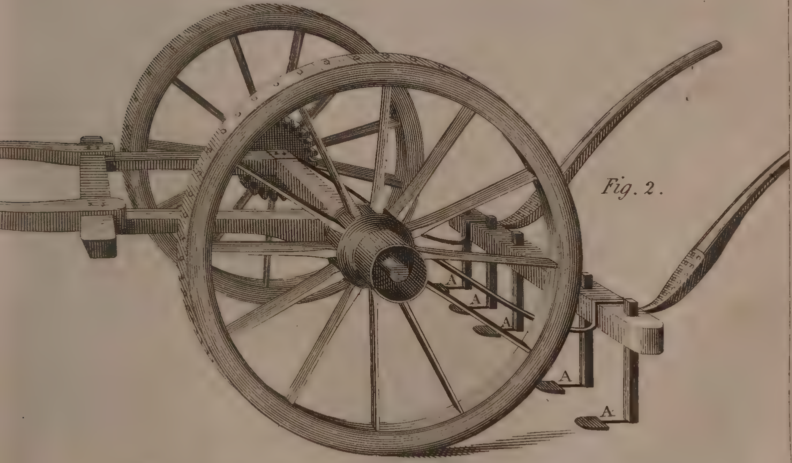


Fig.2.



Revd. J. Cooke's Drill Machinery.

through these into the incisions or drills, made in the land by the coulters K, K.

L, a hook affixed to the axis of the wheels; *l*, a chain applied to the coulter-beam, the last link of which, when put upon the lowest hook, will prevent the tubes of the funnels from being displaced; while the machine is crossing deep furrows or gutters.

M, an iron pin, projecting from the coulter-beam, which being lifted on the hook L, at the end of the land, will bear the coulters out of the ground, while the machine is turning round, or on any other occasion, without additional labour to the person who attends the plough.

N, a cog-wheel.

O, another cog-wheel, turned by the wheel N.

P, a lever and string, passing over a pulley to the axis of the cylinder H:—by moving the lever P, to the notch in the staple Q, the wheel O, will be prevented from acting with the wheel N; so that the distribution of grain or seed may be stopped at pleasure.

R, an iron bar, perforated with holes, by means of which, and of a pin passing through the holes, the seed-box may be raised or lowered, so as to keep the lid of the box horizontal, whether the machine be ascending or descending steep hills, or moving on level ground.

S, S, two staples in the ends of the seed-box, for the reception of two slips of wood, with canvas to prevent the wind from dispersing the grain or seed: and also to prevent dirt or soil from falling off the wheels into the funnels I, I.

PATENT HORSE-HOE.

Fig. 2, (see the plate) represents the shafts, the axis, and wheels: the coulter-beam with handles, &c. as in Fig. 1; being part of the same machinery, and convertible into an horse-hoe, with 6 shares, by taking away the seed-box E, E, the cylinder H, H, the funnels I, I, the coulters K, K, as in Fig. 1, and substituting the hoes A, A, A, A, A, A, Fig. 2, for the coulters.

HAND-HOE.

Fig. 3, A, is the hoe-plate or share of different sizes, for drills at different distances.

B, the wings for earthing up the soil to the rows of corn; and which may be occasionally taken off.

C, the handle.

D, a wedge, applied to the upper or under side of the handle C, so as to raise, or reduce it, according to the height of the person using it.

Fig. 4, a rake that may be applied to the handles of the machine instead of the coulter-beam, and may be used for making hay, clearing land from dog's-grass, or couch-grass, and for other purposes.

Directions for using the machine: The practice of drilling, says Mr. Cooke, should not be attempted, unless the soil be so dry, as not to adhere to the feet,—except it be to regain a late or lost seed-time. If the soil abound with large dry clods, these should be reduced by a heavy roller. Previously to being drilled, the land ought to be ploughed deep, and lightly harrowed, to render the surface level.

When the horse is put in the shafts, care should be taken that the chains by which he draws, be of equal lengths; otherwise the machine will deviate from the direction in which the animal advances. In going to, or returning from the field, the pin or guide M, must be lifted on the hook L, which will bear the coulters off the ground. And, when passing through rough roads, if the coulter-beam C, C, and the axis of the wheels, be lashed together by a rope or chain, it will prevent the coulter from receiving any injury, by reaching the ground suddenly.

The cylinder H, H, is furnished with cups or ladles of four different sizes, for various kinds of grain or seeds, which are distinguished by the numbers 1, 2, 3, 4.—No. 1, (the smallest size painted white) is calculated for rape, lucerne, cole-seed, clover, &c. and will sow 2lbs. per acre. It will also sow turnip, after the rate of one pound per acre; every other cup being closed with a small quantity of soft clay. No. 2, (painted red) for wheat, and will sow one bushel per acre.—No. 3, (painted green) for barley; and will sow from 1 to 1½ bushel per acre.—No. 4, (painted yellow) for peas, beans, oats, vetches, &c. and will sow two bushels per acre. Although the above quantities of grain or seed are specified, they may be increased or diminished by raising or lowering the slides (G, G, Fig. 1) at pleasure.

The funnels are applied to their respective places by numbers 1, 2, 3, 4, 5, 6; and, for drilling at nine inches, they ought to correspond with the numbers 1, 2, 3, 4, 5, 6, of the seed-box; six coulters being fixed in the beam, at the distance of nine inches from each other. For drilling 12 inches apart, five coulters should be fixed in the beam, 11¼ inches distant from each other, when the order of the funnels will stand 1, 4, 5, 2, 3, 6, and no seed will be put in the box opposite the funnel No. 5, when placed as above: the unemployed funnel may be stopped with paper, to receive any seed dropping into it accidentally. In a similar manner, Mr. Cooke's machine may be so regulated as to deposit grain or seed in drills at 18 or 22 inches apart, or at any other distance.

If the coulters should not make the incisions or drills deeper than two inches in light sands or loams, or less than two in strong clays or wet soils, they may be forced into the ground by the hand, or by weights, or a beam of wood 4 feet long, and three or four inches thick, being suspended by chains or cords at the hooks T, T, in the handles of the machine, for that purpose.

In attempting to render the drills strait, if the horse should deviate from his proper course, the coulter-beam and coulters may be easily removed in any direction, in order to remedy that irregularity. In different parts of the kingdom, the lands or ridges are of various sizes: where the machine is too wide for them, one or more funnels may be stopped with loose paper, and the seed received into such funnel, returned into the upper seed-box. In drilling narrow high-ridged lands, the outside coulters may be lowered, and the middle ones raised, so that the points of the coulters may form a curve similar to that formed by the ridge. When shut, the top of the seed-box should always be kept horizontally level: thus, the distribution of the seed will be uniform. The higher the front edge of the box is raised upon the bar R, the more copiously will the seed descend into the lower boxes; and consequently a greater quantity be distributed.

No wheat should be deposited more than 1½ or 2 inches deep in strong clays, or wet soils, nor less than 2 inches deep in all dry lands. Those which are intended to be drilled with carrot-seed, should be deeply ploughed; and for every half acre of land, one bushel of saw-dust and one of carrot-seed should be provided: the former ought to be well dried and sifted, in order to take out all the lumps and chips, and divided into eight equal parts. The carrot-seed should likewise be well dried, and rubbed between the hands, to take off the bears, so that it may readily separate. It must then be divided into a similar number of heaps or parcels: each of these is to be gradually mingled, till the whole of the seed and dust are thoroughly incorporated; in which state it may be regularly sown in drills, by the cups or ladles No. 2. One of these cups, when filled with saw-dust, will, upon an average, contain three or four carrot-seeds, by which means the whole of the latter will be distributed with the same regularity as any other grain or seed. If the wind should blow violently, so as to render it difficult to proceed in sowing the grain, that inconvenience may be obviated, by fixing a screen of matting or of canvas before the seed-box, which, together with the side wings (S, S, *Fig.* 1), will perfectly shelter the seed from wind or rain.

Directions for using the Horse-hoe.—Having already explained the construction, we shall briefly state a few circumstances relative to the management of this instrument.

In order to hoe a crop of any kind that is drilled at the distance of 9 inches, the horse ought to be conducted along the third row, or drill, computing the rows from the left side of the 6 rows, drilled at one operation of the machine. The person who attends the hoe, should carefully keep the pin (B, *Fig.* 2) immediately over the third row of corn, by which means the implement cannot receive any injury.

For hoeing corn at 12 inches apart, the horse should be conducted along the second space, between the rows or drills, computing the spaces from the left side of the five rows, drilled at one operation of the machine.—The man attending the hoes, ought carefully to keep the pin (B, *Fig.* 2) directly over the middle of the second space, described as above: this rule will apply to the hoeing of ground at various distances.

Different soils require to be hoed with shares of a proportionate size, which experience alone can ascertain. In light sandy loams, or any other soils sufficiently pulverized, shares from 5 to 6 inches broad, for 9 inch drills, and 8 inches broad for 12 inch drills, may be safely and effectually worked: for strong clays intermixed with pebbles, the hoe-shares should be somewhat less in breadth. But, if the soil, in the spaces of the rows of corn, be pulverized with long narrow plates of iron, similar to chisels, being introduced into the shanks of the hoe-share, A, A, A, A, A, A, (*Fig.* 2) instead of hoe-plates, the advantages resulting from such a process will be very considerable.

Beside the hoeing of drilled corn, this horse-hoe may be applied to many useful purposes, particularly for cutting up the rows of stubble, as soon as the crop is harvested, together with such weeds as may have escaped the hoe: it may also be employed for the stirring of fallows, &c. after the rate of 10 acres per day, with one man, a boy, and two horses, especially in the busy time of harvest, when it would be impossible to spare so many men and horses as are required to break up the land effectually with the common ploughs.

The price of Mr. COOKE's *Improved Drill-plough*, together with Horse-hoe, &c. was in the year 1790, *twelve guineas.*

Excellent, however, as Mr. COOKE's machine unquestionably is; it must be acknowledged, that in some parts it is too complicated. This circumstance has induced Dr. DARWIN to apply his versatile talents to the purpose of devising improvements in the construction of this grand national plough, which will transmit his name to posterity, as an enlightened agriculturist, no less than a medical philosopher who has deeply searched into the recesses of Nature.—Of these essential improvements we are (by the liberality of Mr. JOHNSON, the publisher of Dr. DARWIN's classical work, entitled *"Phytologia, or the Philosophy of Agriculture,")* enabled to communicate accurate engravings, together with an analysis of the subject, contained in the appendix to that useful book.

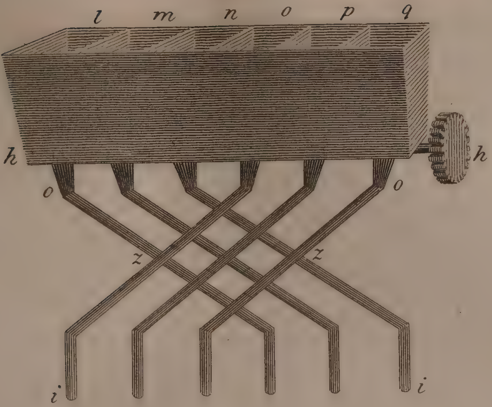
Description of the Plates representing Dr. Darwin's improvement of the Drill-plough.

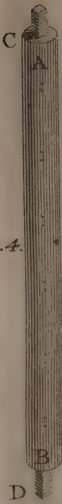
Plate I. *Fig.* 1, *a, a,* are the shafts for the horse, fixed to the centre of the axle-tree, by a simple universal joint at *x*, from which, if the horse move in an oblique course, either spontaneously, or designedly, to avoid trampling the rows of corn, in hoeing, the person guiding the plough behind, may keep the coulters in any direction at pleasure:—*b, b,* are shafts or handles behind, for the man who attends the drill coulters or hoes; these handles are applied to the axle-tree before, and have a transverse piece about 6 inches from the latter at *g, g,* in order to support the seed-box (Fig. 2.)—At the distance of about one foot behind this, there is another cross piece at *c, c,* called the coulter-beam, which is about 4 feet 2 inches long, 6 inches wide, and 2 inches thick: it is perforated with 2 sets of square holes, each set consisting of six, to receive the coulters in drill ploughing and the hoes in horse hoeing.

The light square holes are 9 inches distant, and are designed to receive the coulters, or hoes in the cultivation of wheat, the rows of which are to be 9 inches apart: the six dark square holes are 7 inches from each other, for the reception of the coulters or hoes in the cultivation of barley, the rows of which are to be at the distance of only 7 inches. This coulter-beam has likewise 6 circular holes at one end, and 6 round iron staples fixed into the edge of the other part of it: into these are inserted the ends of the tin flues, which intersect each other, and convey the seed from the bottom of the box into the drills or furrows, when the coulters are properly arranged in the square holes. The person guiding the machine can raise these coulters, or hoes, out of the ground, when passing to or from the field, or in turning at the end of the land; and may thus suspend them on the iron springs *d, d,* which at the same time fix the shafts to the axle-tree, so that the wheels will follow in a similar direction with the horse.—*e, e,* are wheels, four feet

Plate 1.

Fig. 2.





.4.

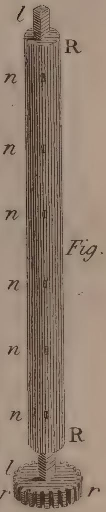
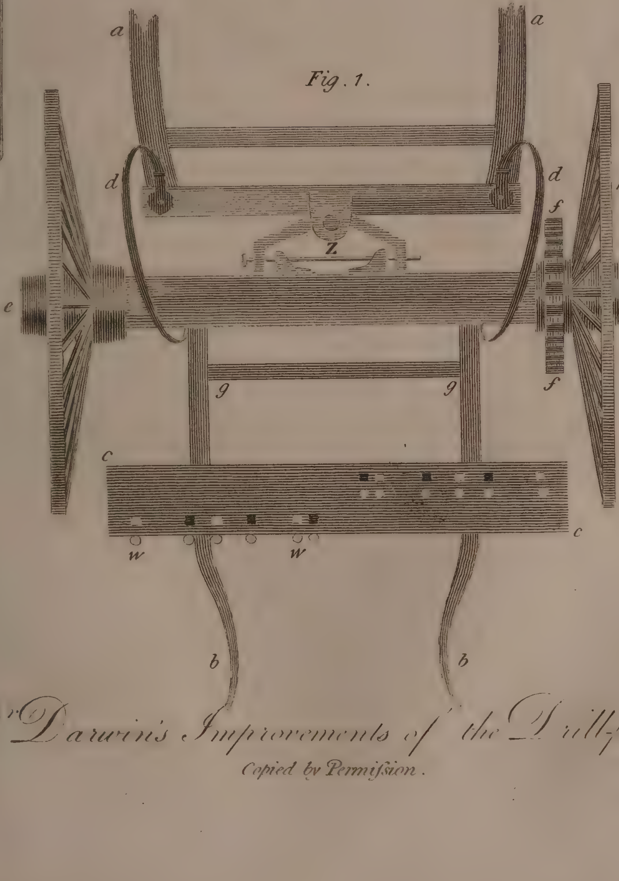


Fig. 3.

Fig. 1.



Dr Darwin's Improvements of the Drill-plough.

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in diameter; upon the nave of one of which is a cast-iron wheel at *f*, *f*, to turn the axis of the seed-box, which has a similar wheel, but only one-fourth of its diameter, so that the axis of the seed-box revolves four times to one revolution of the wheel.

Fig. 2, is the seed-box, consisting of boards about 1 inch thick, 48 inches in length within, 12 in depth, of a similar width at the top, and 6 inches wide at the bottom. It is divided into six compartments for the reception of grain, and ought to have a cover with hinges, to exclude the rain. This box is to be placed partly over, and partly before the axle-tree of the machine, as delineated at *g*, *g*, in Fig. 1. Beneath the seed-box passes a wooden cylinder at *h*, *h*, the circumference of which is excavated for the reception of grain from the six cells marked *l*, *m*, *n*, *o*, *p*, *q*; and for conveying it to the six oblique tin flues, *i*, *i*, which intersect each other, as represented in Plate I. Fig. 2. By this reciprocal crossing, the seed-flues are designed to increase the length of the inclined surface on which the seed descends, in order that, if six or eight grains be delivered at the same time, they may so separate by their friction, when descending, that they cannot be sown together on the same spot, which might occasion tussocks of corn.

As these seed-flues intersect each other before they pass through the coulter-beam at *c*, *c*, (Plate I. Fig. 1), it became necessary to make 3 of the circular holes, at one end of the coulter-beam, more backward than those at the other; and, therefore to use iron staples or rings at one end, instead of perforations, as at *w*, *w*, (Fig. 1.) These tin flues deliver the seed into the small furrows, or drills, which are made by the coulters before them. The seed-flues have a joint at *z*, *z*, where one part of the tin tubes slides into the other part, by which means the former can be occasionally shortened or lengthened, in order to adapt them to the coulters, when placed 7 inches apart, for sowing barley; or, at the distance of 9 inches, for sowing wheat. In the bottom of this seed-box are 6 holes, one in each compartment, for conveying the corn into the excavations of the cylinder, revolving beneath them. These holes are provided, on the descending side, as the cylinder revolves, with a strong brush of bristles, about $\frac{3}{4}$ of an inch in length, which press hard on the tin cylinder. The holes in the bottom of the seed-box, on the ascending side of the revolving cylinder, are furnished with a piece of strong leather (such as is used for the soles of shoes), which rubs upon that side of the cylinder; by which means the corn, of whatever kind, is exactly delivered, while the axis is revolving, without a single grain being cut, or bruised.

Fig. 3, Is the iron axis, and wooden cylinder beneath the seed-box. An iron bar is first made, about 4 feet 6 inches long, and 1 inch square, the weight of which ought to be about 15lbs.; it is covered with wood, so as to form a cylinder 4 feet in length, and 2 inches in diameter, represented at *r*, *r*, in this figure. The use of the iron bar in the centre of the wood, is to prevent it from warping, a circumstance of great importance. This wooden cylinder passes beneath the seed-box, and has a cast-iron cog-wheel at one end of its axis, as at *r, r,* which is one-fourth of the diameter of the correspondent cast-iron wheel, fixed on the nave of the carriage-wheel, as in Fig. 1, *f, f,* so that the axis of the seed-box revolves 4 times during one revolution of the carriage wheels.

In the circumference of this wooden cylinder are excavated four lines of holes, consisting of six in each line, as at *n, n, n, n, n, n.* A similar line of excavations is made opposite to these, on the other side of the cylinder, and between these are two other rows of holes, amounting in the whole to twenty-four excavations in the wooden part of the axis beneath the seed-box, for the purpose of receiving and conveying the corn from the seed-cells into the flues *o, o, i, i,* (Fig. 2), while the axis is revolving: in which respect this improvement of Dr. DARWIN bears some analogy to the original design of the celebrated Mr. TULL.

These excavations are one inch in length, half an inch in width, and three-eighths of an inch in depth, which dimensions are too large for any seeds employed at present in large quantities, except beans; but which may be contracted to any dimensions required, by moving the cylinder over the wooden one, as will be immediately explained.

Fig. 4, A, B, represents a tin cylinder one inch longer within, than the wooden cylinder on the iron axis at Fig. 3: it is 2 inches in diameter within, so as exactly to fit the wooden cylinder, which may slide within it about an inch backwards or forwards.—C, D, are two square sockets of tin, fixed on the ends of the tin cylinder to fit on the square part of the iron axis, passing through the wooden cylinder at *l, l,* Fig. 3, on which they slide one inch, as before.

The following directions for perforating the holes, both in the tin and wooden cylinders, which are mutually to correspond, Dr. DARWIN recommends to be strictly attended to.

1. When the tin cylinder is soldered longitudinally, and one end of it is thus fixed, as at A, six holes ought to be made through it lengthwise on its four opposite sides; each hole must be exactly one half of an inch in width, and 5-8ths of an inch in length, which should be parallel to that of the cylinder. The centre of the first of these holes ought to be five inches distant from the closed end A; and that of the second hole, eight inches apart from the centre of the first; and the others in the same proportion, till six holes are made longitudinally along the cylinder. Another line of six similar holes is then to be made on the opposite side of the cylinder; and after that, two other such lines between the former; the number of holes amounting in the whole to 24, the dimensions of all which should be exactly observed, as well as their distances.

2. The wooden cylinder, fixed on the axis, is now to be introduced into that of tin, so as to leave the exact space of one inch void, at the closed end A; when the size of all these apertures through the tin cylinder (each of which is exactly half an inch in width, and 5-eighths of an inch in length), should be carefully marked with a fine point on the wooden cylinder, which ought not to be previously excavated.

3. The 24 holes, thus marked

on the wooden cylinder, are now to be excavated precisely 3-eighths of an inch in depth, to which are to be added 3-eighths of an inch at that end of each of them which is nearest to A; so that, when the wooden cylinder is again replaced in the tin cylinder as before, with one inch of void space at its closed extremity, the excavations in the former will be 3-eighths of an inch longer than the perforations over them in the latter. These excavations in the wooden cylinder should, likewise, be somewhat narrower at the bottom, effectually to prevent any of the grain from sticking in them, while revolving.

4. An iron screw, about three inches in length, with a square head for the reception of a screw-driver, should be passed through the end A, of the tin cylinder on one side of the axis, as at C, in Fig. 4. The screwing part of this must lie in a hollow groove of the wooden cylinder, and be received into a nut, or female screw, fixed to the same cylinder. The head of the screw, passing through the end A, of the tin cylinder at C, should have a shoulder within the tin cylinder, to prevent it from penetrating through the end of it. A brass ring should also be put over the square end of the screw, on the outside of the tin cylinder, through which end a pin ought to pass, in order to keep the ring steady. Thus, when the square head is turned by a screw-driver, it gradually moves the tin cylinder one inch backwards and forwards on that of wood; so as either to press the end A of the tin cylinder into contact with that of the wooden cylinder within it, or to remove it to the distance of one inch, and leave a void space at the end A.

5. The ends of all the holes of the tin cylinder are next to be enlarged, by slitting the tin 3-eighths of an inch towards A, on each side of the hole; that part, however, of the tin included between these two slits (which will be half an inch wide, and 3-eighths of an inch in length, with respect to the cylinder), is not to be cut out, but bent down into the excavations of the wooden cylinder beneath, so as to lie against that end which is nearest to it.—But, before these pieces of tin are bent down, as just described, they should be filed somewhat smaller at the projecting than at the other end; because the excavations of the wooden cylinder are to be rather narrower at the bottom than at the top; and these pieces of tin, when bent down, ought to fit them exactly.

Lastly, When all these holes are thus enlarged, and the bits of tin filed somewhat narrow at their projecting ends, and then bent down into the excavations of the wooden cylinder, the other end of the tin cylinder, with its square socket, may be soldered on. Thus, when the end of the tin cylinder at A, is pressed forwards upon the wooden one towards B, by turning the screw at C, above described, all the excavations of the wooden cylinder will be gradually lessened, and at length entirely closed; by which means they may be adapted for the reception and delivering of seeds of any size, from horse-beans and peas to wheat, barley, and turnip-seed, with the utmost accuracy, so as to sow 4, 5, or 6 pecks per acre, or more or less, at the pleasure of the cultivator, merely by turning the screw a few revolutions, in either direction.

In farther illustration of these

principles, or directions, Dr. DARWIN observes:

1. That in constructing tin and wooden cylinders beneath the seed-box, another small improvement may become necessary in sowing very small seeds, namely, when the screw at the end A, is turned, so as to contract all the excavations of the wooden cylinder, its surface will become bare for the space of one inch from the end of each excavation towards the end B, (Plate I. Fig. 4), without being covered by the tin cylinder. On these exposed parts, which will be one inch long, and half an inch wide, some seeds may accidentally stick, and evade the brushes which are to prevent them from passing, while the cylinders revolve. To remedy this inconvenience, when the wooden cylinder is placed within the tin one, in such a direction that all the holes are completely open, Dr. DARWIN recommends a piece of the tin cylinder, about an inch and an half in length, and half an inch in width, to be cut out from the extremity of each hole next to the end B, and such piece to be fixed by a few sprigs on the wooden cylinder, exactly in the same place it covered previously to its being cut out of the tin one; by which means, when the tin cylinder is afterwards pushed forwards, by turning the screw at its end, so as to contract the excavations of the wooden cylinder beneath, its bare parts will be an inch and a half distant from the extremities of the excavations next to the end B; and thus will not pass under the brushes: consequently no small seeds can be lodged in them.

2. Some kind of iron staple ought to be fixed on the outside, at each end of the seed-box, to catch hold of the two springs at *d, d,* (Plate I. Fig. 1), when the hinder part of the carriage is elevated by the man guiding it, in order to suspend the coulters out of the ground, and to connect the hinder part of the machine with the shafts before: so that, when turning at the ends of the lands, or passing to or from the field, the wheels may not deviate from the joint *z*, at the centre of the axle-tree, but may follow in the same lines as the shafts.

3. The seed-box should likewise be supported on erect iron pins, passing through staples of that material; with a lever under the end of it, next to the wheel *r, r,* (Plate I. Fig. 3), in order to lift easily that end of the seed-box, about an inch high, and to raise the teeth of the iron cog-wheel on its axis out of the teeth of the correspondent iron one, on the nave of the carriage-wheel.

4. The construction of the coulters which make the drills, and of the rakes, by which they are filled after the seed is deposited, and also of the hoes, are not delineated; as they resemble those employed by persons practising the drill husbandry, and which we have already described, when treating of Mr. COOKE's patent machine.

5. When the lower ends of the seed-flues are placed through the holes in the coulter-beam (Plate I. Fig. 1), at the distance of 9 inches from each other, the rows of wheat or beans will be 9 inches apart: hence, as the wheels of the carriage are 4 feet in diameter, and therefore move about 12 feet at every revolution; and, as there are 4 excavations round the axis of the seed-box, which revolve 4 times to one revolution of the carriage-wheels, consequently the seeds

contained in the excavations of the cylinder beneath the seed-box, will be sown at 9 inches distance in each drill or furrow, while the plough is proceeding.

6. By Mr. Cooke's drill-plough, the quantity of seed sown on an acre is 6 or 7 pecks, that is, about half the quantity used in broad-cast sowing. If the wheat be exactly deposited in the drill, Dr. Darwin is of opinion that one bushel will be fully sufficient for an acre, as the rows are 9 inches apart from each other: for then 8 or 9 grains would be dispersed in every 9 inches of the drill furrow; namely, in every square of 9 inches surface of the land so cultivated.—This may be more clearly ascertained by the following data: Mr. Charles Miller, in the "*Philosophical Transactions*," vol. lviii. has calculated the number of grains in a bushel of wheat to amount to 620,000; Mr. Swanwick, of Derby, has lately computed them at 645,000; Dr. Darwin, therefore, concludes that a bushel, on an average, contains 635,000 grains of wheat. A statute acre comprises 4,840 square yards, each of which contains 16 squares of 9 inches: if 4,840 be multiplied by 16, the produce will be 77,440, which is the number of squares of 9 inches in such an acre. If 635,000 grains in a bushel be divided by 77,440, (the number of squares of 9 inches in an acre), the quotient will shew, that somewhat more than 8 grains of wheat will thus be deposited in every 9 inches of the drills.

7. If 8 or 9 grains be dropped at the same time in one inch of ground, they will, if they all should grow together, be too numerous, and form a tussock; but, by making them slide down an inclined plane, from the seed-box to the coulters, as in the tin flues, which are crossed in order to lengthen them (Plate I. Fig. 2), some of the seeds will, by their friction while descending, be retarded more than others; and the 8 or 9 seeds will thus be scattered over the whole 9 inches of the drill; which renders this method of sowing far superior to that of dibbling; because, in the latter, all the seeds are dropped together.

8. When the holes in the wooden cylinder are entirely open, they are of a proper size for the sowing of horse-beans, or peas: when they are perfectly closed, there will remain a small niche at the end of the excavation in the wooden cylinder, nearest to B (Plate I. Fig. 4), for turnip, or other small seeds. For wheat, barley, and oats, a wooden wedge ought to be made exactly of the same shape as the area of the hole, which the director of the plough requires, who will insert it occasionally in the holes, when he turns the screw at the end of the cylinder, in order to enlarge, or reduce them, according to those dimensions. On these wedges ought to be written, with white paint, *wheat*, *barley*, *oats*, &c. which will considerably facilitate the accommodating of the size of the excavations to each kind of grain; and which may be altered, if requisite, to suit larger or smaller seeds of the same species.

9. In some drill-ploughs, for instance in Mr. Cooke's, there is some additional machinery for drawing a line, while the plough proceeds, in which the wheel that is next to the last-sown furrow, may be directed to pass at a proper distance from, and parallel to it. This, however, may be effected,

when sowing wheat, or peas and beans, by making the wheels, while they run on the ground, at the exact distance of 54 inches from each other; and, at the time of sowing, by guiding the wheel nearest to the part last sown exactly in the rut last formed; by which means every row will be accurately made, at the distance of 9 inches.

To these observations, Dr. Darwin has subjoined some remarks, tending to evince, by comparison, the essential improvements he has made on this complicated machinery, and from which we extract the following:

1. The simplicity of his drill-plough consists, first, in its having a seed-box only, and not a seed-box and hopper, as is the case with Mr. Cooke's patent drill-plough.

2. The flues, conducting the seed from the bottom of the box into the drill furrows, are not disjoined in the middle, to permit the lower part to move either to the right or left, when the horse deviates from the line in which the coulters pass, as in Mr. Cooke's plough: this defect may be remedied by the simple universal joint at *z*, (Plate I. Fig. 1).

3. In this machine, the shafts behind, between which the man guiding the coulters walks, are fixed to the coulter-beam, as well as to the axle-tree; whereas, in Mr. Cooke's patent drill-plough, all these are moveable joints, similar to a parallel rule, in order to counteract the swerving of the horse: which, in this machine, is effected by the simple universal joint at *z*, (Plate I. Fig. 1), already described.

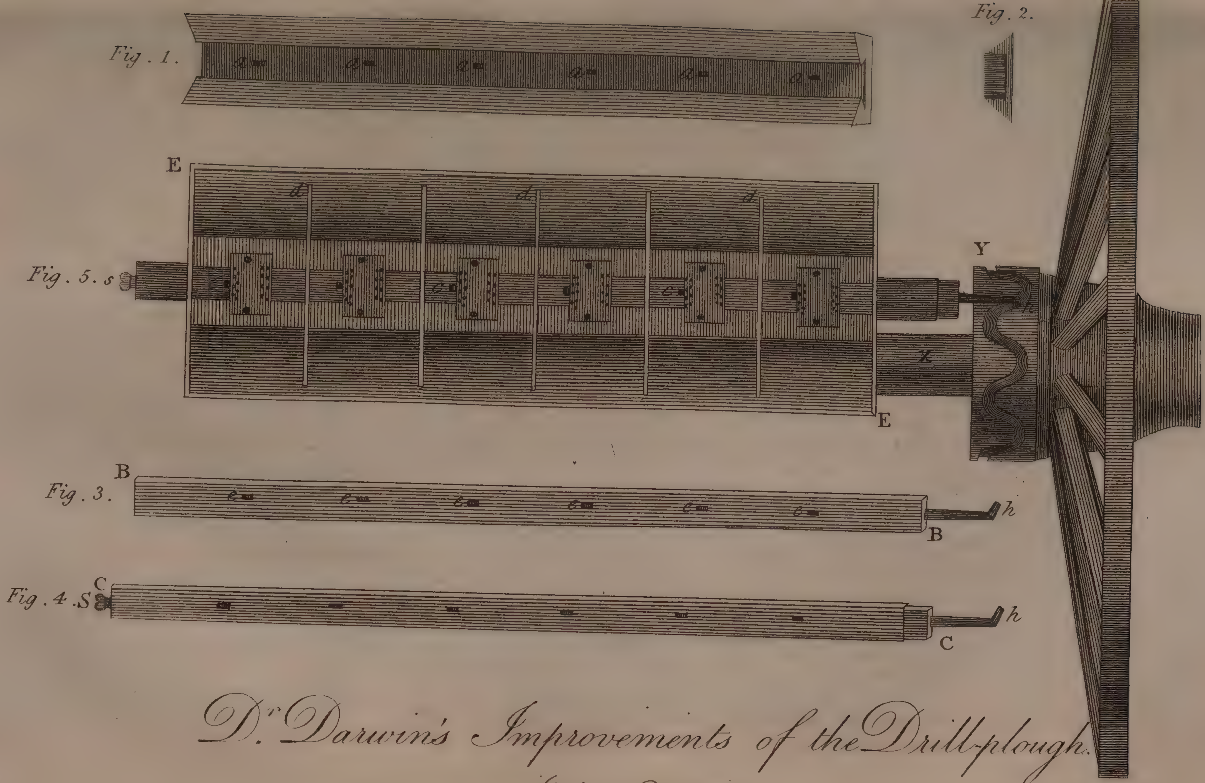
4. The dimensions of the holes in the axis of the seed-box, are here likewise altered, merely by turning a screw, so as to accommodate them to every kind of seeds, which are usually sown on fields, or arable lands.

5. The strong brush of bristles, which sweep over the excavations of the cylinders beneath the seed-box, and strickle them so exactly, that no supernumerary seeds escape; and yet none are either bruised or broken, which sometimes happens in Mr. Tull's original machine.

Lastly, Dr. Darwin justly observes, that the cheaper and more simple the machine is in its construction, the less liable will it be to accidents, which occasion expences in its repair; and, with the greater facility will its management be understood; all which circumstances correspond with its greater simplicity: and, we cordially hope with the Doctor, that the practice of the drill-husbandry will thus be more generally diffused.

Plate II. *Fig.* 1, is a seed-box, invented by Mr. Swanwick, of Derby, who has liberally offered to shew the working models of the seed-boxes, or to assist any person who may wish to construct either this drill machine, or the preceding one, invented by Dr. Darwin.

Mr. Swanwick's seed-box is 48 inches in length within, and is divided into 6 cells, for the purpose of sowing 6 rows of seeds at the same time, similar to that above specified. At the bottom of each cell is a hole *a, a, a, a, a, a,* (Fig. 1), through which the seed passes into the seed-flues, as in the machine before described; but this has no revolving axis, there being only



Dr. Darwin's Improvements of the Drill-plough.

(Copied by Permiſsion)

only a wooden or iron bar, B, B, (Fig 3), about 2 inches broad, 4 feet 8 inches long, and exactly 3-eighths of an inch thick. Through this bar 6 holes are perforated, marked *e, e, e,* &c. each of which is exactly one inch in length, half an inch in width, and 3-eighths of an inch in depth, which is the same as the thickness of the bar. The centres of these holes are exactly 8 inches distant from each other, corresponding to the holes at the bottom of the seed-box, over which it is made to slide backwards and forwards in a groove. By this sliding motion, it passes under stiff brushes which are placed over it on each end of the holes, at the bottom of the seed-box, and strickle off the grain, as the holes in the sliding-bar pass under them, which thus distribute the quantity with considerable accuracy.

In order to increase, or diminish, the proportion of grain to be delivered, the slider is covered with a tin-case, C, C, (Fig. 4,) which is perforated with six holes, corresponding with those in the slider: instead, however, of the bit of tin being cut out the full length of the hole, part of it is left at the end equal to the thickness of the slider, and is bent down, after the slider is put into the case, in the same manner as the tin cylinder in the preceding machine. This case is moveable about one inch, backward and forward, by turning the finger-screw *s* (Fig. 4 and 5), by which the holes are enlarged, or diminished, for the purpose of adapting them to various sorts of grain, or different quantities of the same sort, exactly as in the tin and wooden cylinders in Plate I.—The slider is moved forwards by a bent iron pin, *h*, attached to it, which passes into a serpentine groove, Y, (Fig. 5), fixed to the nave of the wheel: it is likewise moved backwards by a steel spring at the other end of the seed-box, but which is not delineated in the Plate.

Fig. 5, is a bird's-eye view of the parts before described:—E, E, the seed-box divided into cells or compartments, by the partitions *d, d, d.*—*c, c, c,* the slider, with part of the apertures seen just appearing from under the brushes.—X is the axis of the wheel.

Fig. 2, represents a side view of one of the six bridges lying over the holes at the bottom of the seed-box, on each side of which the brushes are fixed, which strickle the holes when full of corn, while the bar slides backwards and forwards. The simplicity of this slider at the bottom of the seed-box, Dr. D. observes, may be, in some instances, greater than that of wooden and tin cylinders in his machine, as Mr. Swanwick's has only six holes for distributing the quantity of corn, whereas the former has twenty-four. In other respects, it is, perhaps, more complicated; as twelves brushes are used, one on each side of the six holes, whereas there are only six brushes rubbing on the tin cylinder in the former machine. The reciprocating motion of this slider must be quick, as it necessarily acts once every time the circumference of the carriage-wheel passes nine inches forward, which may not be so easy to execute as the cog-wheel, with the uninterrupted movement of the axis and cylinder in the preceding machine.

Lastly, Dr. Darwin concludes with remarking, that the facility of adapting the holes to the dimensions required in both machines, and the circumstance, that they neither bruise nor break the grain, and are not encumbered with an additional hopper, which must deliver the quantity of seed with great inaccuracy, from the unequal shaking of the machine, considerably add to the excellence and simplicity of both.

Another implement upon a new principle was invented by Mr. JOHN HORN, of Dover, and by him denominated an "*Universal sowing machine, for drilling or broad-casting*;" for which he obtained a patent, about the year 1785. It is so constructed that, whether worked by the hand, drawn by a horse, or fixed to and used with a plough, it is not liable to be put out of order; there being but one movement to direct the whole. It sows every kind of grain with equal ease and regularity, so that the quantity sown may be varied at pleasure, and in any degree. A correspondent in the 12th vol. of "*Annals of Agriculture*," p. 481, states, that Mr. HORN's invention possesses the peculiar advantage of cultivating turnips, so as to ensure the crop against the ravages of the fly. By sowing the *usual quantity* of turnip-seed *broad-cast* by the machine, and at the same time striking furrows at proper distances in the land, part is deposited in the drills, and the rest sown broad-cast between them: so that, if the season be dry, it will be favourable to the drills, and, if wet, to that which is broad-cast. And, if it happen that the latter be injured by the depredations of the fly, the former, by coming at a later period, is saved; or, if the former be destroyed, the latter is preserved. If the whole thrive, the farmer has the choice of selecting the most vigorous plants from both.—The price of this valuable implement, if constructed so as to be used with a single-furrow plough, is, we understand, 3½ guineas:—if intended for a double-furrow plough, 4½ guineas:—that of the large machine, consisting of a seven-furrow plough, with Mr. HORN's additions, the whole made by himself, is 7½ guineas.—For a more particular account, we refer the reader to a treatise on the subject, published by the inventor (8vo. 6d. Johnson, 1786), entitled "*Description and Use of the Universal Sowing Machine for Drilling and Broad-casting*."

In the 12th vol. of *Annals of Agriculture*, p. 197, we also meet with a communication from a Mr. J. HARVEY, of Elmley, in which he announces his invention of an engine that plants every kind of grain in a manner, he conceives, never before attempted. It is a common wheel-plough, to which is fixed a simple piece of machinery, for conveying, by means of an engine fixed to the plough, immediately behind the mould-board, any quantity of grain into an incision in the heart of a furrow, of whatever depth: the seed is effectually and instantly covered by an instrument suspended to the engine. The whole machinery consists of iron, yet does not exceed 20lb. in weight.—The engine may be worked without a handle (unless at the end), which does not retard the sowing, or add much to the labour of the horses. The inventor observes, that it may be employed on any soil, and in all seasons; the seed being covered to protect it from the effects of the weather.—The price of Mr. HARVEY's implement, exclusively of the plough to which it is fixed, does not exceed three guineas.

The last of these various contrivances, of which we shall take notice, is the *Drill* and *Hoe-Plough*, invented a few years since by a Mr. RIDGE, of which an engraving is given in the 60th vol. of the *Gent. Magazine*, for 1790; where its principles and mechanism are described.—This machine is so constructed that, by means of a handle, the man employed has power to hold or guide it in a strait direction, without any attention to the going of the horse being requisite, farther than is rendered necessary in a common plough: and, whether the implement be drawn up, or down a hill, or horizontally, it deposits the corn with equal regularity, and at any given depth; so that none of the seed will be buried too deeply in the earth, or exposed to perish on the surface. Thus, it is asserted, one-third of the usual quantity of seed may, in general, be saved; and, in some cases, more than one-half.

The wheels on which Mr. RIDGE's plough moves, are half a rod in circumference; and, by computing their revolutions, when they have once passed over the field, the portion of seed sown may be ascertained, if the machine be supplied with a certain quantity. The number of acres that can thus be drilled in one day, depends on the distance at which the rows of corn are set. Stones, it is said, are no obstruction to the drilling of corn, by means of this implement; provided they be not too large to pass between the tines, or tubes, which deliver the seed to the ground.

The plough here alluded to, may be used for sowing every kind of grain, or seeds, not only with facility and regularity, but also without bruising them; and, as soon as the crop grows up, it may be employed with equal advantage as a horse-hoe. Its construction is stated to be so simple, that in half an hour a common ploughman may be made to comprehend its movements, sufficiently to be entrusted with it for the whole season. On level soils, one horse, in general, will be fully competent to draw it; but, in ascending steep hills, or on very stiff land, two will become necessary.—The price of this expensive implement, we understand, is about 14 guineas.

For a more particular account of the drilling system, we must refer our readers to Mr. AMOS's "*Theory and Practice of Drill-Husbandry*," (4to. 18s.) published a few years since, in which the matter is fully investigated, and the advantages and disadvantages are fairly appreciated. But those, who wish to acquire only a general knowledge of this important practice, we advise to peruse the Rev. Mr. COOKE's pamphlet (12mo. price 6d.) entitled, "*Drill-Husbandry perfected*."

Before we conclude this highly important subject, it will be useful to state the extraordinary national saving that would arise from a general introduction of the drill-husbandry. Indeed, the patriotic Lord SOMERVILLE, late President of the Board of Agriculture, whose exertions in promoting that beneficial science, must endear him to every friend of his country, has already anticipated our calculations. Though bred to the broad-cast method, which he till lately followed, that enlightened Nobleman has, in the Appendix to his interesting work, entitled "*The System followed*

lowed during the two last years by the Board of Agriculture," &c. (8vo. pp. 300, Miller, 1800), impartially exhibited the great advantages that might result from the national adoption of the drill-husbandry. We regret that our limits will permit us only to extract a few leading circumstances from his Lordship's publication. In order to ascertain, beyond the possibility of doubt, the infinite superiority of the drilling, over that of the broad-cast method of sowing, he applied to three gentlemen alike eminent for their agricultural skill, and each of whom made use of different drill-ploughs. From an accurate statement it appears, that the expences attendant on the old and new practices, are as follow:

Expence of seed-corn on 133 acres of land, sown in the usual broad-cast husbandry in 1799, was - -	£. 134	10	6.
The expence of seed-corn for the same number of acres, according to the present improved system of drilling,	100	4	6
In the year 1800, the expence of 140 acres broad-cast, was	216	10	0
Ditto, - - - ditto, - drilled, -	92	0	0
Which affords a saving of not less than - - - - in seed-corn on 140 acres of land.	124	10	0

Both estimates were made from actual experience, by the industrious Mr. BUDDEN, and communicated to Lord SOMERVILLE by the Rev. H. J. CLOSE, of Hordle, near Lymington; from whose letter we insert the following computation of an *annual saving* that may be effected by the uniform practice of the drill-husbandry; and which, at a moderate calculation, will amount to not less than *eight millions* of bushels of wheat, *one million* of bushels of rye, *three millions* of bushels of barley, *four millions* of bushels of oats, and *one million* of bushels of beans and peas!

Having, however, in the course of attentive observation, during the last twenty years, witnessed many disappointments, both in *statistical* and *political* schemes, we are not so sanguine in our expectations, as to place implicit confidence on any general statement, especially when it is exemplified by *round* numbers. Nevertheless, in justice to the zealous supporters of the drill-plough, we fully admit its superiority over the clumsy and irregular practice of the wasteful broad-cast husbandry; and posterity will ever gratefully remember the names of TULL, COOKE, YOUNG, and DARWIN, if, by their joint labours, *one half* of the above stated quantity of grain and seeds, that is, together *eight or nine millions of bushels*, could be *annually* saved to the nation, before one half of the present eventful century is expired.

DRINKING, is one of the animal functions, essential to the proper solution and digestion of food. Although the proportion of liquid to that of dry, or solid food, cannot be precisely ascertained; yet, if the constant secretion of fluids be laid down as the basis of this computation, we should, perhaps, drink double the quantity of the solid provisions we daily consume. Nevertheless, even this proportion is but too often exceeded, merely to please the artificial cravings of a corrupted palate. Thus, we no longer drink with a view to quench thirst only, but at *certain* hours of the day, whether we are naturally inclined, or not. Nay, we frequently meet with sots in beer, ale, spirits, wine, punch, and even *tea.*—Excessive drink, however, though it distend and oppress the stomach, and thus impede digestion, is not nearly so pernicious as gluttony, unless the former be attended with intoxication. It however impoverishes the whole mass of the blood, by rendering it too thin and watery; so that relaxation of the urinary and other canals, at length, general debility of the system, are its necessary concomitants.

On the contrary, too little drink disposes persons of a sedentary life to indigestion; because many particles of solid food are, for want of dilution, passed unassimilated through the alimentary canal; and the blood becomes viscid, and inert in its circulation. The active and laborious should, therefore, drink more than the idle or phlegmatic; and either of these more in summer than in winter, to supply the great loss of humours exhaled by insensible perspiration.

Persons, whose natural appetite is not depraved in consequence of irregular living, may easily regulate the due proportion of their drink to that of dry aliment; as, to them, thirst will be the safest guide. But those individuals who have become slaves to the libations of Bacchus, are unfortunately deprived of this beneficent instinct, which is the privilege even of irrational animals.

If the moral turpitude of committing excess in drinking, affords no argument to induce the habitual votary to abstain from such pernicious practice, we shall only add, that he will sooner or later feel the effects of it in painful and lingering sickness. To a reflecting mind, it affords matter of just surprize, how so many persons of worth and character, *while sober*, can devote themselves to a custom which they cannot but abhor in their friends. For the sake of a momentary gratification of the palate, wines and spirits are indiscriminately swallowed, and especially by those whose age, labours, and merit in society, often entitle them to neither. Immense quantities of valuable grain, by Nature designed for the support of the poor and indigent, are annually converted into *liquid fire*, or more properly, *poison!* Where is the philanthropist, in our Imperial Senate, who possesses virtue and influence sufficient to stem the torrent of so extensive a system of mischief?

After this involuntary digression, we shall only observe, that large potations are, at all times, and in every constitution, improper; that they are particularly injurious when indulged in previously to the taking of food, and especially before dinner; that all beverage is more pernicious to the healthy in a *warm*, than in a *cold* state; that the human stomach should never be *inundated* with immoderate quantities of drink at one time; and that the most natural drink, and the most conducive to health, without exception, is *pure water*.

DRONE, in natural history, a species of bee, which is nearly double the size of the common working insect. The head of drones is round, the eyes full, their tongue short, and the belly broader than in the other classes; they are likewise of a darker colour, and more thickly clothed.—See BEE, vol. i. p. 215.

DROPSY, a soft, unelastic swelling of the whole or part of the body: in other words, a collection of water under the whole skin, or in the brain, chest, abdomen, &c.

This complaint may originate from various causes, of which the following are the principal:—1. Obstructions in the intestines of the lower belly, especially after agues. 2. Suppressions of natural and periodical fluxes; polypous and other concretions in the blood-vessels. 3. Obstipations of the lymphatics, arising chiefly from a free use of spirituous liquors. 4. Great relaxation of the vascular parts, in consequence of poor, watery and viscid nutriment, impure damp air, &c. 5. A general acrimony of the fluids, after repelled eruptions, or from an accumulation of acrid, gouty, bilious, and other humours. 6. General debility consequent to copious evacuations, or convulsive diseases, which have reduced the whole nervous system:—the operation of all these causes is often promoted by an hereditary disposition of the individual.

Regimen. Drinking was formerly considered as very injurious to dropsical patients, so that physicians often prohibited the use of all liquid food. Later experience, however, has evinced the fallacy of this rule; for, in many cases, the disease has been cured merely by *abundant dilution*; especially in those constitutions which are not naturally phlegmatic. Hence it has been found, that the copious use of mineral waters (see DIURETICS) has frequently been attended with the best effects.—Vegetable acids, such as vinegar, the juice of lemons, oranges, &c. diluted with water, should be drunk in preference to wines or spirits, either of which are generally hurtful. The aged and emaciated, however, may occasionally take a glass of wine, or, with equal advantage, mustard whey, or ginger-tea.—Their diet ought to consist of nourishing and stimulating dishes, but of easy digestion, and to be taken in moderation. White meat, fowls, and even game properly roasted or stewed, may be eaten with toasted bread or biscuits. Horse-radish, onions, and garlic, may be used instead of foreign spices, and in large proportions. But tea, coffee, and punch, are alike improper for irritable and nervous habits.

Muscular exercise and gentle, but often repeated friction of the parts affected, are two primary objects which deserve attention.—The patient ought to live in a warm, dry place, not expose himself to cold or damp air, and wear flannel next the skin, to promote perspiration.—The tepid bath has often procured considerable relief.

Medicine. In the beginning of the disease, brisk laxatives, consisting of rhubarb and cream of tartar, may be of immediate service to the young and robust, but to aged or debilitated patients, we cannot with safety recommend either purgatives or emetics; as the latter in particular, may be attended with serious consequences. In such cases, medical advice should not be neglected. In general, however, small doses of cream of tartar, namely, half a dram, six or eight times a-day; and from six to ten grains of salt-petre, with three or four grains of powdered squill, every morning and evening, may be taken without risk, if professional assistance cannot be easily obtained.—All other drugs, for instance, bark, tartar emetic, camphor, opium, &c. are powerful remedies, which ought to be prescribed by those only who possess the ability of ascertaining the nature and cause of the disease. For similar reasons, we cannot implicitly approve of the external application of *oil*, nor the swallowing of a table spoonful of *common sand* every day: this is a curious, but cheap remedy, which has lately been announced by Dr. GUTHRIE, of St. Petersburgh, who informs us that it was found "to purge the patient pretty briskly, and to procure a relief of all the symptoms."

DROPWORT, or *Oenanthe*, L. a genus of perennial plants, consisting of seven species, five of which ar indigenous; among these the following only deserve notice:

1. The *fistulosa*, or COMMON WATER DROPWORT, which thrives in meadows, ponds, and ditches; and flowers in July. Its naked stalk grows only 12 inches high. The plant is refused by cows and horses; though, from experiments made in this country, it does not appear to be noxious to the former. BECHSTEIN, however, affirms that in Germany this species of the dropwort is a poisonous vegetable, and has been found to produce dangerous effects on man and dogs: its root, therefore, which spreads extensively in a swampy soil, ought to be carefully extirpated.

2. The *crocata*, or HEMLOCK WATER-DROPWORT, or Dead-tongue, which grows in watery places, on the banks of rivers, and in ditches. Its reddish thick stalk attains a height from 3 to 5 feet. According to Dr. WITHERING, the whole of this plant is deleterious; and Dr. PULTENEY remarks, that the root is the most virulent of all the vegetable poisons that Great Britain produces; many instances of its fatal effects being recorded. Unless the contents of the stomach, after eating any small portion of this root (which is sometimes mistaken for wild celery, or parsnip) be immediately emptied by briskly operating emetics, there is no other chance of saving the patient's life; because it speedily produces convulsions, madness, and death.

As a medicine, however, an infusion of the leaves, or three teaspoonfuls of the juice of the root, taken every morning, has in one instance cured a very obstinate cutaneous disease: though we advise such trials to be made only with animals.—According to Mr. GOUGH, the country people in Westmoreland apply a poultice of the herb to the ulcer, which is sometimes formed in the fore part of the cleft of the hoof in horned cattle, and is termed the *foul*.—The inhabitants of Pembrokeshire call this plant, the *five-fingered root*: it is much used by them in cataplasms for the *felon*, or the worst kind of whitlow.—Sheep eat the leaves of this vegetable, but they are refused by cows and horses.

DROWNING, is the act of suffocating, or being suffocated, by a total immersion in water. The length of time during which a person may remain in this element, without being *drowned*, is very unequal, in different individuals; and depends as much on the temperature of the water as on the particular constitution of the subject: in general, however, there is less prospect of recovery, after having continued fifteen minutes in a watery grave. In such cases, death ensues from impeded respiration, and the consequent ceasing of the circulation of the blood, by which the body loses its heat, and, with that, the activity of the vital principle. Dr. Goodwyn justly observes, that the water produces all the changes which take place in drowning, only *indirectly*, by excluding the atmospheric air from the lungs, as they admit but a very inconsiderable quantity of fluid to pass into them, during immersion. Hence we shall find, in the progress of this inquiry, that inflation of the lungs is one of the principal means of restoring life.

Before we describe the various methods and instruments that have been successfully adopted, for recovering drowned persons, it will be useful to advert (on the plan of Dr. Struve) to those circumstances which deserve to be duly weighed, previously to any *active* measures being taken on such unfortunate occasions: 1. The season and weather; 2. Length of time the person has continued under water; 3. The state of his mind when the accident happened: whether he was intoxicated, frightened, &c.; 4. Constitution of the body, and whether he was in a state of perspiration; 5. The height from which he fell, and whether his head plunged foremost; 6. Depth of the water; whether it was cold or warm, sea, or river water, and how he was dressed. Lastly, 7. The manner in which he was taken out, whether by the legs, and without receiving any injury, or by instruments; and whether he was rolled about in a tub, or what other methods were pursued for his restoration.

Few improvements appear to have been made in the treatment of the drowned, since this important branch of medical science was first discussed, in a *popular* manner, by the late Dr. Tissot; yet the names of Cullen, Goodwyn, Cogan, Hawes, and Coleman, in Britain, as well as those of Unzer, Reimarus, and Struve, in Germany, deserve to be respectfully mentioned: from their various publications, and especially of the two last mentioned, we shall briefly state the principal rules of conduct to be observed, with respect to persons in that deplorable situation.

Symptoms of Apparent Death by Drowning.—Coldness; paleness of the whole body; the lips of a livid hue; the mouth either open or firmly closed; the tongue blue, swelled and protruded; the eye-lids closed, the eyes turned, and their pupils dilated; the face swelled and blue; the lower belly hard and inflated. The first signs of returning animation are, convulsive starting of the muscles of the face, or feet; motion of the eye-lids; a spasmodic shivering of the body.

Treatment.—1. After having been carefully taken out of the water by the arms, so as to prevent the least injury to the head and breast, the body ought to be carried to the nearest house (if possible, in a bier, as represented in the Plate, which is described p. 191), with the head somewhat raised; or, in fine warm weather, the resuscitative process may with more advantage be performed in the open air, especially in sun-shine.

2. When the subject is deposited, the upper part of the body should be supported half-sitting, with the head inclining towards the right side.

3. The clothes are to be taken off without delay, but with the greatest

precaution; as violent shaking of the body might extinguish the latent spark of life.

4. The mouth and nose must be cleansed from the mucus and froth, by means of a feather dipped in oil.

5. The whole body should now be gently wiped and dried with warm flannel cloths, then covered with blankets, feather-beds, hay, straw, &c. In cold or moist weather, the patient is to be laid on a mattress or bed, at a proper distance from the fire, or in a room moderately heated; but in the warm days of summer, a simple couch is sufficient.

6. If the patient be very young, or a child, it may be placed in bed between two persons, to promote natural warmth. (See also the *Warming Machine*, delineated in the second Plate, and described p. 192.)

7. In situations where the bath cannot be conveniently procured, bladders filled with lukewarm water should be applied to different parts of the body, particularly to the pit of the stomach; or a warming-pan wrapped in flannel gently moved along the spine; or aromatic fomentations frequently and cautiously repeated.

8. As the breathing of many persons in an apartment would render the air mephitic, and thus retard, or even prevent the restoration of life, not more than five or six assistants should be suffered to remain in the room where the body is deposited.

Stimulants generally employed:

1. Moderate friction with soft, warm flannel, at the beginning, and gradually increased by means of brushes dipped in oil, till pulsations of the heart are perceptible.

2. Inflation of the lungs, which may be more conveniently effected by blowing into one of the nostrils, than by introducing air into the mouth. For the former purpose, it is necessary to be provided with a wooden pipe, fitted at one extremity for filling the nostril, and at the other for being blown into by a healthy person's mouth, or for receiving the muzzle of a pair of common bellows, by which the operation may be longer continued. At first, however, it will always be more proper to introduce the warm breath from the lungs of a living person, than to commence with cold atmospheric air. During this operation, the other nostril and the mouth should be closed by an assistant, while a third person gently presses the chest with his hands, as soon as the lungs are observed to be inflated.—For a more effectual method of alternately introducing fresh air into the lungs, and expelling that which is rendered mephitic, or unfit for respiration, we refer the reader to the second plate, Fig. 1, described in p. 190, and following.

3. Stimulating clysters, consisting of warm water and common salt; or a strong solution of tartar emetic; or decoctions of aromatic herbs; or six ounces of brandy, should be speedily administered.—We do not consider injections of the smoke of tobacco, or even clysters of that narcotic plant, in all instances safe or proper.

4. Let the body be gently rubbed with common salt, or with flannels dipped in spirits; the pit of the stomach fomented with hot brandy; the temples stimulated with spirit of hartshorn; and the nostrils occasionally tickled with a feather.

5. Persons of a very robust frame, and whose skin after being

dried, assumes a rigid and contracted surface, may be put into the sub-tepid bath, of about 65°, which must be gradually raised to 75 or 80°, of FAHRENHEIT's scale, according to circumstances; or the body carried to a brewhouse, and covered with warm grains for three or four hours: but these expedients generally require medical assistance.

6. Violent shaking and agitation of the body by the legs and arms, though strongly recommended, and supposed to have often forwarded the recovery of children and boys, appears to us a doubtful remedy, which can be practised only in certain cases.

7. Sprinkling the naked body of a drowned person with cold water; submitting it to the operation of a shower-bath, or the sudden shocks of the electric fluid; as well as whipping it with nettles, administering emetics, and blood-letting, —are desperate expedients, which should be resorted to only after the more lenient means have been unsuccessfully employed.

It is, however, a vulgar and dangerous error, to suppose that persons apparently dead by immersion under water, are irrecoverable, because life does not soon re-appear: hence we seriously entreat those who are thus employed in the service of humanity, to persevere for three or four hours at least, in the application of the most appropriate remedies above described; for there are many instances recorded, of patients who recovered, after they had been relinquished by all their medical and other assistants.

Treatment on the return of life: As soon as the first symptoms of that happy change become discernible, additional care must be taken to cherish the vital action, by the most soothing means. All violent proceedings should, therefore, be immediately abandoned, no farther stimulants applied, nor even the ears of the patient be annoyed by loud speaking, shouting, &c. At that important crisis, moderate friction only is requisite. And, if the reviving person happen to be in the bath, he may either remain there, provided his sensations be easy and agreeable, or be removed to a comfortable bed, after being expeditiously dried with warm flannels: fomentations of aromatic plants may then be applied to the pit of the stomach; bladders filled with warm water, placed to the left side; the soles of the feet rubbed with salt; the mouth cleared of froth and mucus, and a little white wine, or a solution of salt in water, dropped on the tongue. But all strong stimulants, such as powerful electric shocks, strong odours of volatile salts, &c. are at this period particularly injurious. Lastly, the patient, after resuscitation, ought to be for a short interval resigned to the efforts of Nature, and left in a composed and quiescent state: as soon as he is able to swallow, without compulsion or persuasion, warm wine, or tea, with a few drops of vinegar, instead of milk, or gruel, warm beer, and the like, should be given in small doses frequently repeated.

Having stated the leading particulars to be attended to, in the practical treatment of persons who are on the eve of suffering from aquatic suffocation, we shall accompany them with a few directions, addressed to those humane assistants who often fall victims for want of due precaution in the

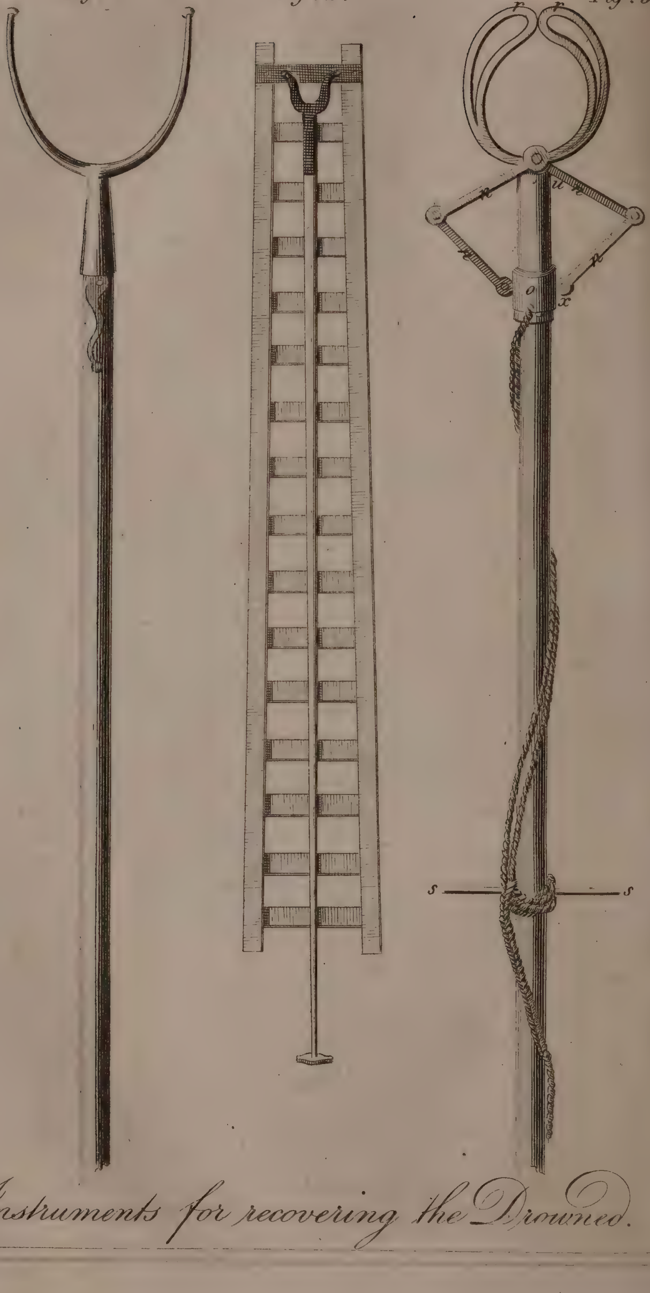


Fig. 1. Fig. 2. Fig. 3.

Instruments for recovering the Drowned.

execution of their benevolent design.

As many fatal accidents happen to individuals who wish to rescue others in danger of being drowned, especially when the former are unskilful in the useful art of swimming, which ought to be learnt at an early period of life, we think it our duty to remind the reader of the two excellent contrivances already described in our first volume, under the articles AIR-JACKET, and BAMBOE HABIT. Every family dwelling on the banks of lakes or rivers, or near ponds, ought to be always provided with two or three such useful articles, to serve in cases of emergency; as it will generally be too late to procure them on the spur of the occasion. Beside the various instruments represented in our first plate on this subject, and immediately to be described, there is another method of discovering the body of a drowned person, when immersed under water. Although we do not give implicit credit to novel and improbable schemes, yet, independently of its presumptive authenticity, we think the following narrative entitled to attention: it is inserted in the 37th volume of the *Gentleman's Magazine*, for April 1767.

The body of a child drowned in the river Kennet, near Newbury, Berks, was discovered by a very singular experiment.—After diligent search had been made to no purpose, a two-penny loaf, with a quantity of quicksilver put into it, was set afloat from the place where the child had probably fallen in, which loaf steered its course down the river upwards of half a mile, before a great number of spectators, when the body happening to lie on the opposite side of the river, the loaf suddenly tacked about, swam across the river, and gradually sunk near the child, when both the child and loaf were immediately brought up, with garblers ready for that purpose.—In apparent confirmation of this extraordinary occurrence, we meet with the following account in Dr. STRUVE's *Practical Essay on the Art of Recovering Suspended Animation, &c.* (12mo. pp. 210. 3s.6d. Murray and Highley, London, 1801).—A student of a certain university being drowned, an unsuccessful search was made for the body. A bye-stander advised his young friends to procure a large loaf; to scoop out part of the crumb; fill the hollow part with mercury, and then to throw this *quicksilver-pye* upon the current: he averred that it would become stationary at the place where the drowned was lying. They followed his advice, and the body was actually found.—As we have had no opportunity of ascertaining the truth of these narratives, by the test of experience, we shall only add, that there appears to be no chemical affinity between mercury and the human body, while in a living and *healthy* state; and that the swimming of a loaf, partly filled with that metal, may perhaps be attributed to a similar degree of specific gravity procured by this artificial combination.

EXPLANATION.

I. *Of the Plate representing the "Instruments for recovering the Drowned."*

Fig. 1, A forked instrument with blunt points, for making a superficial search after the drowned body, and sounding the particular situation in which it lies.

Fig. 2, A ladder with a long, jointed handle, and which we have already mentioned, vol. i. p. 299, when treating of the ICE-BOATS: a model of these boats may be inspected in the Repository of the "Society for the Encouragement of Arts, Manufactures," &c. Adelphi, London.

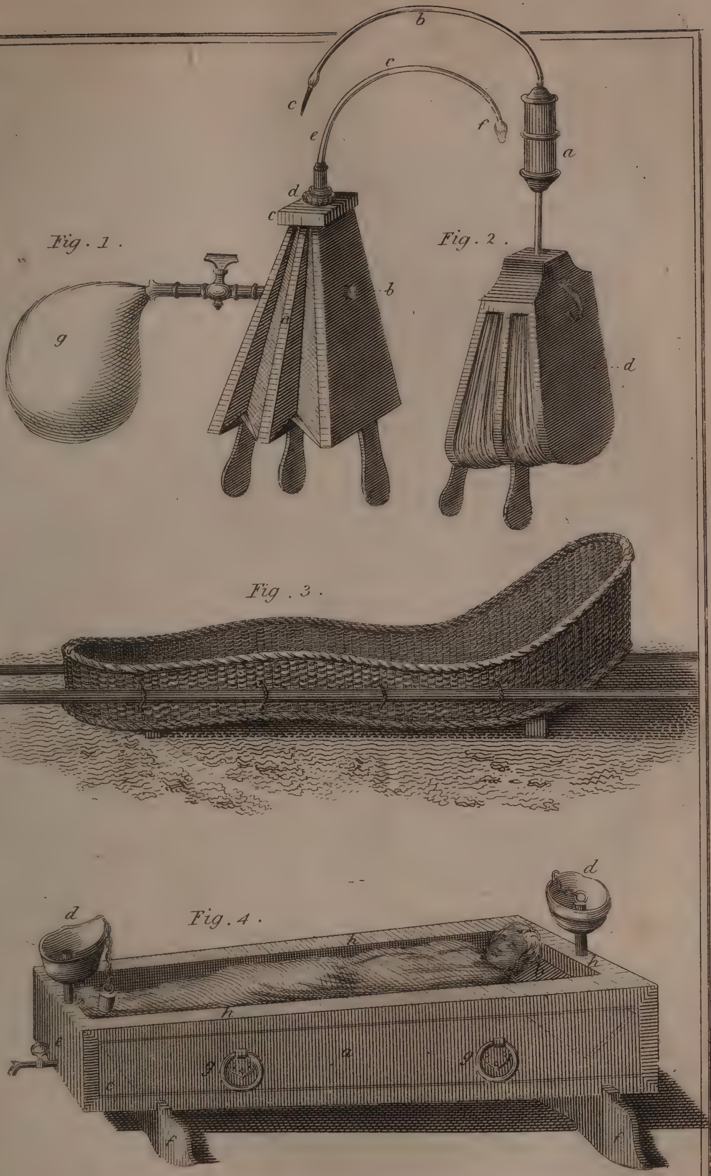
Fig. 3, An *extractor*, or a linked pair of tongs, which in the plate appears closed; but, on immersing it into water, opens by its own weight, as well as by the sliding down of the iron ring *o* from the part marked *x*, to that of *u*. It may again be closed, by pulling the double rope fastened to the ring *o*, which is thus shifted upward from *u* to *x*: by means of expanding the iron arms *n n*, which are likewise connected with this ring, the mouth or flaps of the instrument *r r*, may be shut: and to prevent their opening till required, the two ropes are firmly tied round the iron bolt *s s*; in which situation they remain till the body is extracted.—This instrument, together with that represented, Fig. 1, cost about 2l. at Hamburgh. Great attention is required in preserving them from the effects of rust; and, independently of the weight of iron-work, Fig. 3, is perhaps the most complete piece of machinery that can be contrived for this purpose.

II. *Of the Engraving in which the "Implements of restoration from drowning," are represented.*

Fig. 1, A pair of bellows with two separate bags, so contrived that by opening them, when applied to the nostrils or mouth of a patient, one bag will be filled with common air, and the other with the mephitic air extracted from the lungs; and, by shutting them again, pure atmospheric air will be introduced into those organs, and that drawn out, consequently discharged into the room. Thus, the artificial breathing may be continued, while the other operations on the surface of the body are carried on; which could not be conveniently done, if the muzzle of a common pair of bellows were introduced into the nostril.

a, Is an intermediate board, but which admits of no communication between the two bags. In the external board of each side, there is the usual hole, marked *b*, provided with a valve; and the cylindrical part through which the air is expelled in common bellows, is here soldered to a copper box, within which two other valves are applied to the tubes conducting the air. The cover *d* of this box, which may be unscrewed by means of an interposed leather ring, is almost of the shape of a funnel, to the neck of which is fastened a flexible tube *e*, made of varnished silk cloth, and a spiral wire that forms the cavity. To the extremity of this tube is attached a small ivory pipe *f*, the front of which may either be tubular and round, for introducing it into the nostril: or flat like the top-piece of a clarionet, if it be intended for the mouth. The valves (which cannot be represented in a plate), consist of stiffened taffety, and are so arranged, that the corresponding ones stand in an inverted order. If, therefore, both bags of the bellows be expanded, *two* of the valves open themselves towards the internal part of the machine: one of these is fixed to one of the side-boards, but the other is within the box, on the mouth of the conducting tube belonging to the opposite bag of the bellows.

By



Implements of Restoration
from Drowning.

By this contrivance, the air enters both bags of the bellows at the same time, and is, on compression, again expelled by means of two other valves, which open from within toward the external parts. Both bags of the bellows terminate below the valve in one principal tube of communication; because. tho' the action of both bellows is *simultaneous*, the stream of air, conformably to the arrangement before pointed out, can only enter, and escape, *alternately*.—In using this machine, the small ivory pipe is applied either to one of the nostrils, or put into the mouth: in the former case, the other nostril and the mouth must be closed; in the latter, both nostrils. When the bellows are set in action, one of the bags receives a column of atmospheric air through its valve; while the other, by means of its flexible tube and its valve, extracts a portion of air from the lungs. But, if the bellows are again shut, one of the bags parts with the impure gas drawn out of the pulmonary vessels; and the second conveys pure atmospheric air to the organs of respiration. By properly repeating this alternate process, the patient may again be enabled to exercise the important function of breathing. As, however, a precipitate and irregular method of proceeding might be productive of injury, this delicate operation ought to be performed by persons who are acquainted with the mechanism of respiration.—In some cases, where the patient has, for a considerable time, lain under water, or was afterwards neglected for want of due assistance, it would be desirable to introduce into his lungs *oxygen*, or pure vital, dephlogisticated air, instead of that of the common atmosphere; as the latter is generally more or less corrupted on such occasions by the breath of many persons in the same room. For this purpose may be used a bladder, marked *g*, which is provided with a cock and pipe fitted or screwed to the board of the inspiring valve and bag of the bellows. If, therefore, after opening the cock, the machine is set in motion, it will extract the pure air contained in the bladder, and, on the subsequent compression of the bellows, force it into the lungs of the patient.

Fig. 2, A machine for injecting the smoke of tobacco by way of clyster, in those desperate cases which require the application of this remedy. It consists of a pair of bellows, to the muzzle of which is fitted a metal box, *a*, provided with a ring, in the middle of which it may be unscrewed, and again closed, after being filled with tobacco, and set on fire: the pipe *c* (which, by mistake, is represented with a sharp point in our plate, but should be perfectly round and blunt at the top) of the flexible tube *b*, is introduced into the fundament; and thus, by means of the bellows *d*, the smoke is forced into the rectum.

Fig. 3, A bier of wicker work, in the form of a slanting, oblong basket, for conveying the body of the drowned, in a posture somewhat raised. This simple contrivance has the advantage, that the water may easily run off, while the patient is carried: and, as many unfortunate persons are materially injured by rough treatment, before they arrive at a house of reception, so that their recovery is thus often frustrated, we recommend the universal adoption of this useful implement. It costs at Hamburgh only ten marks currency, or about 15s.

Fig. 4, The *Warming Machine* of block tin, or other metal, was originally invented by Mr. HARVEY, of London, who suggested it to our Royal Humane Society, and it was subsequently improved by M. BRAASCH, an ingenious mechanic, of Hamburgh. Its object is to procure an uniform degree of warmth, throughout the apparatus, in the most expeditious manner, by filling the hollow or double bottom and sides of the whole implement with boiling water.—*a* is the body of the machine, seven feet long, and made of solid pieces of block-tin, to prevent the necessity of soldering them, and consequently the formation of iron-rust: it rests on two wooden legs *f f*, and may be easily carried by the handles *g g*.—The water is poured in through both funnels *d*, *d*, in order to warm it more speedily; and each of these is provided with a stopper (as represented in the Plate, suspended on a chain), with a view to prevent, if necessary, too sudden evaporation and cooling of the water:—*h* is the intermediate space between the two metallic plates, producing a vacuum of 2½ inches, in which the fluid is diffused over the whole machine;—*b* is a wooden desk to support the head of the patient, and to protect it from the immediate contact with the heated parts; but, on the opposite end of the machine, there is an enlarged intermediate space *c*, for holding such a quantity of water and vapours as will procure an additional, or at least a more permanent, degree of heat towards the lower extremities, than to the trunk of the body. For discharging the water, when it is not wanted, or changing it when too cold, there is a cock at *e*. The hollow sides of this machine are about twelve inches high; and in order to ensure an uniform warmth, the body apparently dead should be placed on a straw mattress, and tucked in with blankets. A pailful of water is required to fill the whole machine, as a smaller quantity would warm the sides only for a short time, by means of the vapour.

It deserves to be remarked, that this ingenious contrivance may also be used for a *warm bath*; for which purpose, the inner space in which the body lies, should be supplied with water. The whole apparatus, in its present improved state, made of *copper*, costs at Hamburgh about 200 marks, or from 14 to 15l.

Lastly, we cannot conclude this subject, without affording the reader a view of the different articles belonging to a complete chest of instruments, and other materials, employed in the various processes for recovering suspended animation from drowning. The merit of these institutions in England, is due to Drs. COGAN and HAWES, the founders of the Royal Humane Society at London; but the improved arrangement of the chest now to be described, together with the choice of internal and external remedies, were made by one of our most esteemed surgeons, Mr. KITE, in 1788, though considerably extended in 1790, by Mr. REDLICH, a respectable medical practitioner at Hamburgh. This gentleman is likewise one of the most active members of the Humane Society in that city, and has offered the following articles for sixty-five marks, or about four guineas and a half.—His complete chest contains:

A small bottle of rectified spirit of wine.
Ditto, white wine vinegar.
Ditto, sweet oil.
Ditto, white French brandy.
Ditto, volatile sal ammoniac.
Ditto, vitriolic æther.
Ditto, mustard-seed.
A machine for injecting the smoke of tobacco.
A leather tube, together with a pair of bellows, for inflating the lungs.
Another tube of leather, for introducing medicines into the stomach.
A small syringe for clearing the throat of mucus.
Three woollen covers, or blankets.
Four brushes, and six woollen cloths, for performing friction.
Several emetics.
Two lancets for blood-letting.
One pound of tobacco.
A roller and cushion, to be used in venesection.
Two quills, a sponge, and some lint.
A pocket-knife.
An apparatus for striking fire.
Chamomile and elder-flowers.
Common salt—and a printed copy (in German) of rules and directions for treating the drowned.

Conceiving that a chest containing all these articles could not be purchased in London for less than double the price above stated, beside the additional trouble of procuring them, we have inserted this account; especially as the commercial intercourse between Hamburgh and this country, is daily increasing.

DRUNKENNESS, is that state in which, from the intemperate drinking of liquors, reason has lost its powers, and the person intoxicated is unable to govern himself.

This odious vice is but too prevalent among the lower order of people, who, under the erroneous idea of drowning care, indulge themselves in strong liquors; and by gradually acquiring habits of intemperance, not only undermine their constitution, but also become a disgrace to society.

Drunkenness may be considered as a breach of the law of Nature, which directs us to preserve the use of our reason. By the law of this country, it cannot be pleaded as an excuse for committing trespasses and crimes; nay, any person who is found intoxicated, incurs a penalty of five shillings, or, in case of non-payment, is to be set in the stocks. Those who are guilty of it a second time, may be bound in a certain sum for their good behaviour; and, if any alehouse keeper be convicted of the offence, he is liable to be deprived of his license for the term of three years. These are wholesome regulations, and it is sincerely to be wished, that they were more frequently enforced, as well for the benefit of individuals, as on account of the national character.—See INTOXICATION.

DRY-ROT, a disease incident to timber, used for building, such as flooring-boards, joists, wainscoting, &c.

Dr. Darwin is of opinion, that the dry-rot may be entirely prevented, by soaking the timber first in lime-water, till it has absorbed as much of it as possible, and, after it has become dry, immersing it in a weak solution of vitriolic acid in water, which he supposes will not only preserve it from decay for many centuries (if it be kept dry), but also render it less inflammable; a circumstance that merits considerable attention in constructing houses.

In the Transactions of the Society for the Encouragement of Arts, we meet with the following account of the cause of the dry-rot in timber, and the method of preventing it, communicated by Robert Batson, of Limehouse, Esq.—He observes, that the dry-rot having taken place in one of his parlours, to such a degree as to require the pulling down part of the wainscot, every third year; and perceiving that it arose from a damp stagnated air, and from the moisture of the earth, he determined, in the month of June, 1783, to build a narrow closet, next the wall through which the moisture came to the parlour: this expedient had the desired effect. But, though the rot in the parlour was totally stopped, the evil soon appeared in the closet, where fungi of a yellow colour arose in various parts. In the autumn of the year 1786, the closet was locked up about ten weeks: on opening it, numerous excrescences were observed about the lower part; a white mould was spread by a plant resembling a vine or sea-weed; and the whole of the inside, china, &c. was covered with a fine powder of the colour of brick-dust. On cleaning out the closet, it was discovered that the disease had affected the wood so far as to extend through every shelf, and the brackets that supported them. In the beginning of the year 1787, he determined to strip the whole closet of lining and floor, not to leave a particle of the wood behind, and also to dig, and take away, about two feet of the earth in depth, and leave the walls to dry, so as to destroy the roots or seeds of the evil. When, by time, the admission of air, and good brushing, it had become properly dry and cleansed, he filled it of sufficient height for the joists, with anchor-smith's ashes; because no vegetable will grow in them. The joists being sawed off to their proper lengths, and fully prepared, they and the plates were well charred, and laid upon the ashes; particular directions being given, that no scantling or board might be cut or planed in the place, lest any dust or shavings might drop among the ashes. The flooring-boards being very dry, he caused them to be laid close, to prevent the dust getting down, which perhaps, in the course of time, might bring on vegetation. The framing of the closet was then fixed up, having all the lower pannels let in, to be fastened with buttons only, so that, if any vegetation should arise, the pannels might with ease be taken out, and examined.

In some situations, it might be expedient and necessary to take out a greater depth of earth; and where ashes can be had from a foundery, they may be substituted for those of anchor-smiths; but house-ashes are by no means to be depended upon.

At the expiration of seven years from the period of making this experiment, the wainscot was removed, and the flooring-boards also taken up, when they were found entirely free from any appearance of the rot: two pieces of wood (yellow fir) which had been driven into the wall as plugs, without being previously *charred*, were alone affected with this disease.

DUCK, the COMMON WILD, or *Anas boschas*, L. an aquatic fowl, from which the common tame sorts derive their origin.

This bird frequents the lakes of different countries, and feeds upon frogs and several sorts of insects.—The wild-ducks pair in the spring; build their nests among rushes near the water, and lay from ten to sixteen eggs. The mallard, or drake, though it varies in colours, always retains the curled feathers of the tail, and both sexes the form of the bill.

Wild-ducks abound particularly in Lincolnshire, where great numbers are taken annually in the *decoys*, which, in that county, are commonly set at a certain rent, from 5 to 20l. a year; and there is a decoy in Somersetshire, which is rented at 30l. The birds of the former county principally contribute to the supply of the London markets; as surprizing numbers of ducks, widgeons, &c. are annually taken.

The situation proper for a decoy, should be chosen, where there is a large pond surrounded with wood, in a marshy and uncultivated country. As soon as the evening sets in, the decoy *rises*, as it is termed, and the wild-fowl feed during the night. This rising is, in Somersetshire, called *roading*.—The decoy-ducks are fed with hemp-seed, which is thrown over the screens, in small quantities, to bring them forwards into the *pipes* or canals, and to allure the wild-fowl to follow; this seed being so light as to float.

There are several *pipes* that lead up a narrow ditch, at the extremity of which is a funnel-net. Over these pipes (which are narrower from their first entrance), is a continued arch of netting suspended on hoops. It is necessary to have a pipe or ditch for almost every wind that may blow; as it depends upon this circumstance to which pipe the birds will resort; and the decoy-man always keeps on the leeward side of the ducks, to prevent his effluvia reaching their sagacious nostrils. Along each pipe, at certain intervals, are placed skreens constructed of reeds, which are so arranged, that it is impossible the wild-fowl should see the decoy-man, before they have passed towards the end of the pipe, where the purse-net is placed. The wild-fowl are induced to go up one of these pipes, because the decoy-ducks, trained to this, lead the way, either after hearing the whistle of the decoy-man, or being enticed by the hemp-seed; they will then dive under water, while the wild-fowl fly on, and are taken in the purse.

It often happens, however, that the wild-birds are in such a lethargic state, that they will not follow the decoy-ducks. Recourse is then generally had to a dog trained for the purpose: he passes backwards and forwards between the reed-skreens; this attracts the eye of the wild-fowl, and they advance towards the animal to drive him away. At length, the decoy-man appears behind a skreen, and the wild-birds, not daring to pass by him in return, nor being able to effect their escape upwards, on account of the net-covering, rush on into the purse-net.

The general season for catching fowls in decoys, is from the latter end of October till February: the taking of them earlier is prohibited by an act 10 Geo. II. c. 32, which forbids it from June the 1st to October the 1st, under the penalty of 5s. for each bird destroyed within that period.

Tame ducks are very useful for destroying the black caterpillars, snails, or slugs, which infest turnip fields: hence, if they are turned into such fields, they will devour all the insects, and do no injury to the crop.

It is remarkable, that ducks are extremely fond of the entrails of other animals, and almost every kind of filth. Hence their flesh, though much relished by the epicure, is of a strong, alkaline flavour, and not easy of digestion. Those who are afflicted with ulcers, or cutaneous eruptions, as well as invalids and convalescents who are liable to eructations, ought carefully to abstain from this enticing, but hurtful food. If a small quantity of a roasted duck must nevertheless be eaten, it ought to be mixed, during mastication, with a considerable proportion of toasted bread, or biscuits, to absorb and sheath the acrimony which it contains. It is, however, equally absurd and injurious to take drams of spirituous liquors after eating such meat; for, instead of assisting the digestive organs, this momentary stimulus cannot fail ultimately to relax them: hence drinking should for a few minutes be delayed, and afterwards water or beer may be used, in very small draughts, which will not inundate and weaken the stomach.

DUCK's-MEAT, or *Lemna*, L. a genus of plants, consisting of four species, all of which are natives of this country, and grow abundantly in ponds, ditches, and stagnant waters. They are in flower from June to September, and afford a grateful food to ducks and geese, from which circumstance this vegetable has received its name.

In Germany, it is, on account of its various economical uses, often cultivated, by removing the whole plant in pails, and putting it in stagnant waters.—When mingled with bran, it affords excellent food for geese and other poultry. In Thuringia, hogs are reared and fattened with a mixture of duck's-meat, bran, and ground barley. But the most profitable employment of this vegetable, we learn from Bechstein, who informs us, that "from these apparently useless *fibrous roots*, a yarn may be spun, which is equal to that obtained from flax."

Duck's-meat is of a cooling, emollient nature, and has therefore been applied to inflammations, erysipelas, or the shingles; and also to the gout, either alone or mixed with barley-meal. Country people sometimes employ it for removing the jaundice: hence, they infuse it in white wine, to the quantity of six ounces, to be taken nine days successively, at the end of which period, it is said to have effected a cure.

DUEL, a single combat, on some private occasion or quarrel, in consequence of a challenge.

Taking away the life of a person,

son, by deliberate duelling, is, by the law of this country, a species of murder; and consequently, it charges the crime and inflicts the punishment of homicide on the principals, and likewise, according to the nature of the case, on their seconds. It has also been enacted, that challenges to fight, whether by word or letter, as well as the carrying of such messages, are punishable by fine and imprisonment. And, if they arise from gambling, the offender, by the 9 ANNE, c. 14, incurs the forfeiture of all his goods to the Crown, and an imprisonment for five years.

Such, however, has been the prevalence of fashion, that neither the terror of severe penalties, nor any other consideration, have been able to abolish a practice so unjustifiable, and, at the same time, so unbecoming every person who aspires to the character of a rational agent. It must, nevertheless, be acknowledged, that neither duelling with weapons, nor boxing, is in such repute at present as it was a few years since; and we trust, that from the good sense of individuals, and the vigilance of the law, it will in a short time be completely abolished.

DUMBNESS, is the privation, or want, of the faculty of speech.

This unfortunate defect proceeds chiefly from total and native deafness; if it arise from a deficiency in the organs necessary for uttering sounds, it is always incurable. Several instances, however, have occurred of persons born deaf, who have been taught to speak distinctly; to read, write, understand arithmetic, &c.

The most eminent teachers of the dumb in this country, were;

1. Dr. WALLIS, who, in the 61st number of the *Philosophical Transactions*, gives an account of two persons he had taught to speak; and, in the 245th number of the same work, his method is explained.

2. Mr. THOMAS BRAIDWOOD, late of Edinburgh, who is perhaps the first person that ever brought the surprizing art of imparting speech to dumb persons to any degree of perfection. He first commenced his useful labours in 1764, and, in the course of a few years, enabled many to speak, write, &c. We regret that we cannot communicate a clear idea of his method, which indeed will not admit of being so fully explained in writing, as to enable any person to teach it.—Mr. B. used to pronounce first the sound of *a*, slowly, at the same time pointing out the figure of that letter, and making his pupil watch the motion of his mouth and throat; he then put his finger into the pupil's mouth, depressing or elevating his tongue, and making him keep the parts in that position. Next, he laid hold of the outside of the wind-pipe, and squeezed it in a certain direction, which we confess ourselves utterly unable to describe. While he was pronouncing the letter *a*, his pupil was anxiously imitating him, uncertain of, or rather not comprehending, the nature of the sound he was required to utter. In this manner, Mr. BRAIDWOOD proceeded, till his tyro learned to pronounce the sounds of the different letters of the alphabet. Mr. B. then continued in the same order to join vowels and consonants, till at length his pupil was enabled both to speak and read.

It would be injustice to omit mentioning the labours of the very ingenious Abbe L'Epee, of Berlin, who has deservedly acquired great celebrity by his method of teaching dumb persons to speak, by signs or characters. For an account of his plan, we must refer our readers to the "*New Memoirs of the Royal Academy of Sciences*," &c. of Berlin for the year 1785 ("*Noveaux Memoires de L'Academie Royale*," &c.) in which they will find a short account confirmed by facts.

DUNG, properly signifies the excrements of animals, together with the litter. It likewise comprehends whatever will ferment with soil, such as the green stalks of leaves and plants, when buried in the earth, &c.

The value and use of the dung of most animals, are sufficiently proved by experience. Much, however, depends on adapting the various kinds of dung to different soils, the defects of which are as unlike as the dung employed to improve them: some lands are too cold, moist, and heavy; others are too light and dry; to ameliorate which, there is hot and light dung, such as that of horses, sheep, pigeons, &c. as also fat and cooling, viz. that of oxen, hogs, and the like.

Dung possesses two remarkable properties, one of which is to produce a sensible heat, greatly promoting vegetation; the other is, to fatten and render the soil more fertile. The first of these is seldom to be found, unless in the dung of horses, or mules; the great effects of which, when newly made, and somewhat moist, are conspicuous in our kitchen gardens, where it invigorates and gives new life to every plant, supplying the absence of the sun, and affording us all the vegetable delicacies of the spring.

Horse-dung, however, is equally excellent for steril and poor lands; but, if it be used when too new, or be laid on alone, it is to some soils very pernicious; or, if it be spread too thinly on dry lands during the summer, it proves of very little service; its fertilizing properties being absorbed by the sun, which renders it little more than a heap of stubble, or dry thatch. Hence, horse-dung is best calculated for cold ground, while that of cows is adapted solely to a hot one: when mixed together, or with mud, both form an excellent manure for either of those soils.

The dung of deer, and sheep, differs but little as to its properties, and is, in the estimation of some agriculturists, the most proper for cold clays: with this intention it should be pulverized, and spread thinly over the autumnal or spring crops, in the proportion of four or five loads per acre, in the same manner as ashes, malt-dust, &c. are strewed.

Hog's-dung is supposed to be fatter and richer than that of any other animal; and has been found to be the most serviceable to apple, pear, and other fruit-trees. It is also particularly excellent for grass, one load of it being said to be more beneficial than two of any other manure.

The dung of pigeons and hens contributes greatly to improve meadow and corn-lands. The former is, without exception, the richest that can be laid on arable soils; but previously to being used, it ought to be exposed to the air for a short space of time, in order to exhale part of its fiery ingredients. It is, in general, very proper for cold clay-lands, but should be carefully dried before it is spread; being apt, during wet weather, to clod together in lumps.—The dung of poultry, is of a heating nature, abounds with salts, and greatly tends to promote vegetation; it is more speedy in its operations, than that of animals, feeding on the leaves of plants.

Goose-dung is a very valuable and useful manure to the husbandman. Beside its fertilizing properties, when laid on land, the dung of these birds contributes to the fattening of sheep; and it is a circumstance deserving notice, that cattle, and sheep in particular, are most partial to, and fatten best on, those pastures on which the largest quantity of goose-dung has been dropped.

However excellent dung is from its own nature, it acquires additional vigour, if mixed with lime, in the proportion of one-fourth of the latter to three-fourths of the former. By this means, a smaller quantity of manure is consumed; the seeds of weeds, where this composition is laid on, are effectually destroyed; and the fermentation of the dung promoted, which consequently heightens its fertilizing properties.—See MANURE.

DUNG-HILLS, or *Dung-meers*, in husbandry, are places where soil or dung is collected, mixed with other putrefactive ingredients, and left to digest together. For this purpose, the usual practice is, to dig a pit of sufficient depth to contain the stock of soil which the husbandman may be able to collect. Into this pit are thrown the refuse of fodder, litter, dung, weeds, &c. which lie there, and rot, till the farmer may have occasion to make use of the compost.—Dr. DARWIN, however, proposes to place the heap of manure or dung on a gently-rising eminence, with a bason beneath, in order that the superfluous water, which would otherwise prevent the fermentation of the straw, may drain off, and be collected. He adds, that some earth, weeds, leaves, saw-dust, or other vegetable or animal recrement, should be thrown into the bason, which will thus promote the fermentation and putrefaction of the substances it contains, while the draining from the dung-heap will not be dissipated.

This, doubtless, is a more rational plan of constructing dunghills, as the alkaline liquor thus collected, may farther be advantageously employed for steeping wheat, or other seed-corn; which, in consequence of such saturation, will vegetate more luxuriantly, and yield a more abundant harvest.

DWALE: See Deadly NIGHTSHADE.

DWARF-TREES, a kind of diminutive fruit-trees, frequently planted in the borders of gardens, and so denominated from their low stature.

Dwarf-trees were formerly in great request, but have been much neglected since the introduction of espaliers. The method of propagating *dwarf-pears*, which have been found to succeed better than any other dwarfs, is as follows: They are to be grafted on a quince-stock, about six inches above the ground; and, as soon as the bud has sprouted so far as to have four eyes, it is to be stopped, in order that lateral branches may shoot forth. Two years after budding, the trees will be ready to be transplanted to the spot where they are to remain. They should be set at the distance of 25 or 30 feet square, and the intermediate space may be sown or planted with culinary

linary herbs, while the trees are young; but such herbs are not to be placed too near their roots, which would thus be obstructed in their growth. Stakes are next to be driven around the tree, to which the branches of it are to be nailed with list, while young; being trained in an horizontal direction, and no branches being afterwards permitted to intersect each other: in shortening the roots, the uppermost eye should always be left outwards. The summer and autumn pears thrive most luxuriantly, when planted in this manner, but the winter pears do not succeed.

Apples are also sometimes cultivated as dwarfs; for which purpose they are generally grafted on paradise stocks. These do not spread their branches so widely as pears, and therefore require to be set only 8 feet apart. Some gardeners also rear dwarf-apricots and plums, which, however, being less hardy than either apples or pears, seldom thrive when set according to this method.

DWARF-BAY: See MEZEREON.

DWAY-BERRIES: See Deadly NIGHTSHADE.

DYEING, generally signifies the art of tinging cloth, stuff, or other matter, with a permanent colour, by penetrating its substance. It is, however, usually confined to the art of imparting different colours to wool, silk, linen and cloth.

The materials for dyeing are so various and numerous, that our limits oblige us to be concise. The same difference, indeed, prevails among the dyeing, as among the colouring matters. Some ingredients produce durable colours, which cannot be discharged, either by exposure to air, or by washing with soap. Others, though they may withstand the action of soap, cannot resist that of the air. These are distinguished by the different appellations of *true* and *false*, *permanent* and *fading*, &c.; nor has any method been hitherto discovered, of imparting to *false* colours a durability, equal to that of the true ones.

This object has often been attempted, by combining a permanent with a fading colour, in the expectation that the former would communicate some portion of its durability to the latter; which nevertheless uniformly faded, leaving the cloth dyed with the permanent colour. In some cases, however, which have been already explained, the volatile colour imparts its property to that which would otherwise continue in a fixed state. A solution of tin in *aqua regia* will, it is affirmed, give to many of the fading colours a high degree of beauty, and some portion of durability, though much inferior to the others.

The most *permanent* dyes we have, are cochineal and gum-lac, for fine red and scarlet colours; indigo and woad, for blue; and, when mixed with different proportions of cochineal, or gum-lac, for purple and violet colours.—Dyers-weed, and some other vegetables, for yellow; and madder for coarse reds, purples, and blacks. The *fading* colours are far more numerous, and include Brazil-wood, logwood, red-wood, fustic, turmeric root, anotto, archil, &c.

The whole of the operative part of dyeing depends on the application of certain colours, which the workmen call *primitive*, and which are five in number, namely, *blue*, *red*, *yellow*, *fawn*, or root-colour, and *black*. Each of these furnishes a variety of intermediate shades, both according to the nature of the ingredients, and the acid or alkaline substances with which they are mixed. Two only of these five colours, should be prepared with ingredients producing no colour of themselves; but which, by their peculiar acidity, and the fineness of the earth they contain, dispose the pores of the substance to receive the dye. The colours which more particularly require such auxiliary process, are red and yellow, together with those derived from them. Black is obtained by a particular preparation; but blue and fawn colour require none, at least for wool; it being only necessary to scour and soak this substance well; then to immerse it in the dyeing vat, stirring it well about, and permitting it to remain for a longer or shorter time, in proportion as the colour is intended to be more or less deep.—The ingredients used in dyeing *blue* consist of pastel, woad, and indigo.

1. PASTEL *(Isatis tinctoria)*, is prepared by gathering it when ripe, suffering it to rot, and then working it up into balls for drying; which weigh in general from 150 to 200 pounds, and resemble a collection of small dry lumps of earth, intermixed with the fibres of plants. In order to extract the colour, it is necessary to provide large wooden vats, from 12 to 16 feet in diameter, and 6 or 7 feet high, or of a magnitude proportioned to the quantity intended to be used. The preparation of the blue-vat is the most difficult process in the art of dyeing; and the practical directions given by those who understand it, are either defective, or mis-stated.—The copper-cauldron should be placed as near to the vat as possible, and filled with pond-water; to which, if it be not sufficiently putrid, may be added 2 or 3 pounds of hay, together with 8 pounds of brown madder, or of the bark of the root. The fire should be lighted about three o'clock in the morning, and the mixture boil for an hour and a half, or two hours, when the liquor is, by means of a spout, conveyed into the vat, in which a peck of wheaten bran is previously infused. The pastel-balls are next to be put in, separately, while the liquor is running into the vat, in order that they may be the more easily broken and stirred with the rake, which is a semi-circular wooden instrument, having a long handle. The mixture is occasionally agitated, till the vat has received all the hot liquor; and, as soon as the vessel is nearly half full, it should be covered with a lid, somewhat larger than its own circumference. A cloth should be likewise thrown over it, in order to confine the heat; after which the whole should be suffered to subside for four hours; when it ought to be uncovered, in order to give it air, and to mix it thoroughly. No *lime*, as is generally, though falsely directed by dyers, should be put into the vat, but a small air-hole left on the top: the stirring and agitation may once more be repeated, at the expiration of three or four hours.

If the ingredients, after these operations, be not yet ready and *come to*, that is, if the blue does not rise to the surface, but continues to foam, it will then be necessary, after working the mixture well, to let it stand an hour and a half longer; care being taken during that time to observe it minutely, in case it should *cast blue*. The vat is then to be filled up with water, and a sufficient quantity of indigo, dissolved in a ley of pot-ash, pure water, bran and madder. The vat being again covered, at the end of three hours a pattern is to be immersed in the liquor for a similar space of time, when it is to be taken out, to inspect the state of the vat. This pattern, when first taken out, should be of a green colour, but instantly turn blue; if the green be bright and good, the vat is to be stirred again, and then covered up, with the addition of a few handfuls of bran. Three hours after, the same operation is to be repeated, with the addition of more bran, if necessary, when it is to be covered up for an hour and a half longer; and, as soon as it subsides, another specimen is to be immersed in it for an hour, when it must be examined, to ascertain the state of the pastel. If the former be of a good green, when taken out, and turn suddenly to a deep blue, on being exposed to the air, another pattern is to be put in, to discover the effect of the vat; which, if the colour be sufficiently high, is to be filled with hot water, or (which is preferable, if it can be procured), with the liquor of an old madder-vat, and then stirred again. Now the vat is to be once more covered for an hour; after which the stuffs to be dyed should be immersed.

Woad is the next article in the making of a blue colour: the mode of preparing it differs in no respect from the preceding one, just described, excepting that it is weaker, and yields less colour.

Indigo is the last ingredient in dyeing blues. The vat is about 5 feet high, 2 feet in diameter, and somewhat narrower towards the bottom, being surrounded by a wall, and having a vacancy for the embers. A vat of this size requires from 2 to 5, or even 6lbs. of indigo; and this operation is conducted as follows: 1. About 15 gallons of river water are put into a copper to boil for about half an hour, together with 2lbs. of pot-ash, 2 oz. of madder, and a handful of bran. 2. Immerse 2lbs. of indigo in a pail of cold water, in order to separate the solid from the volatile particles, which will immediately rise to the surface. The watery liquor is then poured off, and the indigo, settled at the bottom of the pail, should be triturated in an iron mortar, with the addition of a small quantity of hot water, that ought to be shaken from side to side; and the floating particles of indigo, which are those most finely pounded, must be poured into another vessel. In this manner, the indigo remaining in the mortar is continually reduced, fresh water being repeatedly added, till the whole is pulverized so finely as to rise to the surface.

The liquor which had, during the above stated preparation, been boiling in the copper, is now poured into the vat, together with the indigo, when the whole is well stirred with a rake, the vat closely covered, and surrounded with embers. If this operation commence in the afternoon, the embers must be renewed in the evening, and also in the morning and evening of the following day, in the course of which it should be twice gently stirred. Similar measures ought to be pursued on the third day, in order to preserve an uniform heat, and intimately mix the ingredients. A brassy scum will then be perceived to rise to the surface, in several detached parts: by continuing the heat on the fourth day, the scum becomes more coherent; and the froth, occasioned by stirring the liquor, appears blue, while the latter is of a deep green. As soon as it assumes this appearance, the vat should be filled; for which purpose a fresh liquor must be prepared, by putting 5 gallons of water into a copper, together with a pound of pot-ash, and half an oz. of madder. When these ingredients have boiled half an hour, the decoction is poured into the vat, the whole well stirred, and, if it produce much froth, it will be in a proper state for working the next day. This may likewise be ascertained by the brassy or scaly crust, which floats on the surface of the liquor; and, farther, if on blowing, or stirring, the latter with the hand, it assume a deep green colour, while the surface appears of a brownish blue.

After the vats have been thus prepared, the dyeing of woollen or silken stuffs is very easy; no other process being required, than immersing them in warm water, wringing, and then steeping them in the vat for a longer or shorter time, according to the deepness of the colour intended to be imparted. The stuffs should be occasionally opened, that is, taken out of the vat, wrung over it, and exposed to the air for a minute or two, till it become blue: for it must be observed, that, in all the solutions of indigo, or other dyeing materials above described, the blue colour is produced only by exposure to the air, and the stuff, on being first drawn out of the liquor, always appears green, and will retain that tinge, unless it be exposed to the air. In dyeing blue, therefore, it is necessary to let the colour thus change previously to a second immersion, that the shade may be the better distinguished, as dark blues require to be repeatedly dipped.—The method of dyeing cotton or linen blue, varies so little from that already described, as to render any farther directions unnecessary.

2. The next of the primitive colours to be considered is RED, of which there are many shades and varieties; but the principal are scarlet, crimson, and madder-red. The process to be adopted for obtaining these colours, essentially differs from that of blues; as the former require a peculiar preparation of the stuffs to be dyed, on the exactness of which, the goodness of the colour in a great measure depends. These preparatory ingredients consist of alum, tartar, aqua-fortis, or a solution of tin in this acid. Galls and alkaline salts are also sometimes added, though they do not materially contribute to the colour.

There are three kinds of *scarlet*, namely, that dyed with *kermes*, with *cochineal*, and with *gum-lac*.

The first of these, called *Venetian scarlet*, is the most permanent, but the least bright: it is also apt to be less spotted than the others; but, on account of the difficulty of procuring the insects which afford the colour, it is very seldom, if ever, used in this country.

The second kind of scarlet, namely, that dyed with *cochineal*, is less permanent than the Venetian scarlet, though the drug is procured at a more reasonable price. It is, however, very difficult to dye the true cochineal scarlet: the success of this operation equally depends upon the choice of the material, the water employed, and the method of preparing a solution of tin, which is the only ingredient by which that delicate colour can be produced. To eight ounces of spirit of nitre an equal quantity of river-water is to be added; in this mixture are to be gradually dissolved half an ounce of the purest and whitest sal-ammoniac, and two drams of purified salt-petre. An ounce of tin, reduced to grains, by being dropped into cold water while melting, is next to be added drop by drop to the liquor thus prepared; the first being perfectly dissolved before a second is introduced. The solution resembles that of gold, and, if fine tin be employed, will be perfectly transparent, without any dust or sediment. With this liquor are to be mixed such proportions of cochineal as may be thought proper, and the stuffs dyed in the colour will acquire a most beautiful scarlet.

The scarlet produced by *gum lac*, though not so bright as cochineal, is more permanent; the best lac is that which is of a blackish brown colour on the outside, and white within. The process of preparing this colour is very difficult; but the best method, we believe, is that of previously mixing the gum with comfrey, or other mucilaginous roots. These should be dried, finely pulverized, afterwards boiled for fifteen minutes in the proportion of half a dram to a quart of water, then strained through a linen cloth while hot, poured upon levigated gum-lac, and passed through a hair sieve. The whole is then digested in a moderate heat for twelve hours; and the gum remaining at the bottom should be stirred seven or eight times. The liquor thus impregnated with a fine crimson colour, is afterwards poured into a vessel, sufficiently capacious to hold four times the quantity, and filled up with cold water. On adding a small proportion of a strong solution of alum, the coloured mucilage subsides; and, should any tinge remain in the liquor, it may be precipitated by gradual additions of alum, till it become perfectly colourless. As soon as the crimson mucilage has entirely subsided, the clear water must be carefully decanted, the remainder filtered, and the fluid parts suffered to evaporate. If the whole of the colour should not be extracted by the first operation, it ought to be repeated, till the residuum changes to a pale straw-colour.

In order to dye scarlet with this extract of gum-lac, the requisite proportion of the latter dried and pulverized, is to be put into an earthen or block-tin vessel; a little hot water poured upon it; and, when it is well moistened, a proper quantity of the composition added; the whole being stirred with a glass pestle. By this means the powder, which before was of a dark, dusky purple, acquires an exceedingly bright scarlet colour. A solution of the crystals of tartar is then to be poured into the liquor, and as soon as it begins to boil, the cloth is to be repeatedly immersed in it, according to the common method. The remainder of the operation is to be performed in the same manner as if cochineal had been employed.

Crimson is the colour produced by cochineal, with alum and tartar only, without any solution of tin. For this dye, two ounces and a half of alum, with an ounce and a half of white tartar, are to be taken, for every pound of wool; and being put into a cauldron with a proper quantity of water, the solution should boil before the stuff is dipped. The wool is then immersed into the boiling liquor, where it continues two hours; after which it is to be taken out, wrung gently, rinsed in water, and put into a bag. A fresh liquor is next prepared for the dye, in which an ounce of finely-powdered cochineal is used for every pound of wool: when this decoction boils, the stuff is immersed, and managed in the manner already directed for scarlet. For producing the finest crimson dye, however, the wool is again to be dipped in a weak lixivium, made of equal parts of sal-ammoniac and pearl-ashes.

The preparation of the ingredients for *madder*-red is always with alum and tartar, the proportions of which are by no means ascertained even by dyers. The more general practice is, to put 5 ounces of alum and one of red tartar to every pound of worsted, a twelfth part of acid water being likewise added, and the wool boiled for two hours in this solution, in which worsted is to be kept for a week; but cloth will be sufficiently saturated in four days. A fresh liquor is then prepared for dyeing this wool; and when the water is nearly boiling, half a pound of the finest madder is to be thrown in for every pound of wool; being carefully stirred and well mixed in the copper, previously to immersing the stuff, which is to be kept in the liquor for an hour; during which the latter must not boil, lest it should tarnish the colour.

The third primitive colour is YELLOW, for obtaining which there are ten different ingredients; but four of these only yield a good and permanent dye, namely, dyers'-weed, or, as the dyers call it, weld, savory, dyers' green-weed, and fenu-greek. The first of these, namely, *weld*, in general affords the truest yellow, and is therefore preferred to all the others. Savory and dyers' green-weed, being naturally somewhat green, are more advantageously employed for dyeing that colour; and the last yields different shades of yellow.

In order to dye worsted and stuffs yellow, they undergo the usual preparation with tartar and alum: of the latter 4 ounces are allowed to every pound of wool, or 25 lbs. to every 100; of the former, one ounce is sufficient for yellow; after dissolving both, the wool is boiled in the same manner as in the preceding colour. A fresh liquor is next to be made for the *welding* or *yellowing*, in the proportion of 5 or 6 lbs. of dyers'-weed to every pound of stuff. Some inclose the drug in a clean woollen bag, to prevent it from mixing with the cloth to be dyed; and, in order to keep the bag down in the copper, they lay a cross of heavy wood over it. Others boil the weld in the liquor, till the water has imbibed all its colour, and the drug sinks to the bottom, when the stuff is suspended in a net: others, again, take the weld out, as soon as it is boiled. According to the shade required, other vegetables are occasionally mixed with that drug. By varying the proportions of the salts employed, as well as the quantity of colouring ingredients, and the time of boiling, different shades may be produced.

The fourth primitive colour is that denominated by dyers the

FAWN, or *root* colour. It is a kind of brown, and the process for dyeing it is widely different from those just described; the wool merely requiring a simple immersion in water, as already directed for blue. The materials employed consist of the green shell of the walnut, the root of the walnut-tree, the bark of alder, santal or saunders-wood, sumach, and soot.—The green walnut-shells are collected, when the nuts are thoroughly ripe; they are put into tubs or casks, which are afterwards filled with water, and are thus preserved till the succeeding year.

Santal, or saunders-wood, is much inferior to walnut-shells; because, if used in too large a quantity, it stiffens, and consequently injures the wool. It is in general mixed with galls, sumach, and alder-bark, without which its colour could not be extracted: and though it yields very little with alum and tartar, it is nevertheless used in large quantities, on account of the solidity of its colour, which is naturally a yellow-reddish brown.

The best of the different ingredients employed in dyeing fawn-colours, is the bark or rind of the walnut-tree. Its shades are uncommonly fine; its colours solid; and it renders the wool dyed in it flexible and soft. A cauldron half full of water is placed over the fire; and as soon as it grows warm, bark is added in proportion to the quantity of stuffs intended to be dyed, and the lightness or depth of the shades required. It is then boiled for about a quarter of an hour, when the cloths, being previously moistened with warm water, are immersed, frequently turned, and well stirred, till they have sufficiently imbibed the colour. They are aired, dried, and dressed in the usual manner.

Next to the rind or bark, the root of the walnut-tree is the best dye for a fawn-colour: it also affords a variety of shades, similar to those produced by the bark, for which it is frequently substituted. The root, however, requires a different process: A cauldron is filled about three parts full of river-water, into which the root is immersed, after being tied up in a bag. When the liquor is very hot, the wool or stuff is plunged into it, repeatedly turned, and occasionally aired. The lighter stuffs are next to be dipped, till the colour is completely extracted. During this operation, proper care should be taken to prevent the liquor from boiling, as in such case the piece first immersed would imbibe the whole of the colour.

The process of dyeing with the bark of *alder*, is nearly the same as that pursued with walnut-roots: the boiling of it is at first not very material, as this drug very freely communicates its colour. It is chiefly used for worsteds, imparting shades darkened with copperas; and for wool that is not required to be very dark, as it equally withstands the effects of the sun and rain.

Sumach possesses nearly the same properties as the bark or rind of the walnut-tree; its colour is not so deep, somewhat inclining to green, but is solid and permanent. Where dark colours are required, sumach is frequently substituted for nut-galls, in which case a greater proportion becomes necessary.—These different substances, however, are not unfrequently mingled together, and, as they are of a similar nature, and differ only in degree, it is easy to obtain various shades.

With respect to the method of compounding the different ingredients with pulverized *saunders-wood*; 4 lbs. of the latter are to be put into a copper, with half a pound of powdered nut-galls, 12 lbs. of alder-bark, and 10 lbs. of sumach. The whole is to be boiled, when a small portion of water should be added, to check the boiling: after immersing the cloth, stirring, and turning it repeatedly, it is aired, and washed in river-water. The quantities of these ingredients may be increased, or diminished, according to the depth of the shade required.

The last substance employed in dyeing the fawn-colour, is *soot*, which is not only less solid than the others, but also hardens, and imparts a very disagreeable smell to the wool, or stuff, dyed in it: it is therefore seldom, if ever used, unless the other ingredients cannot be easily procured.

The fifth, and last, of the primitive colours, is BLACK, which includes a great variety of shades. In order to impart a good black to woollen stuffs, they should be first dyed of as deep a blue as possible, which is called the *ground*, and is to be performed in the manner already directed.—As soon as the cloth is taken out of the vat, it ought to be well washed in river-water, and afterward scoured at the fulling-mill. Next, the dyeing process is performed as follows: For every cwt. of cloth, 10 lbs. of logwood cut into chips, and an equal quantity of Aleppo gall-nuts pulverized and inclosed in a bag, are to be put into a cauldron of a moderate size, where the whole is boiled for twelve hours in a sufficient quantity of water. A third part of this liquor is then to be poured into another cauldron, with 2 lbs. of verdigrease, when the cloth is to be immersed for two hours, being repeatedly turned and stirred, the liquor in the mean time boiling very slowly, or rather, gently simmering. At the expiration of that time, the stuff is to be taken out, and the second part (being another third) of the liquor added to the first third, together with 8 lbs. of copperas. The fire beneath the cauldron is then to be diminished, and the copperas left for half an hour to dissolve; the liquor being gradually cooling: after which the cloth is to be immersed for another hour, repeatedly turned as before, then removed and cooled.

The remainder of the liquor is next to be mixed with the first two-thirds; and the bag carefully expressed; when fifteen or twenty pounds of sumach are to be added, together with two pounds of copperas. The whole is then made to boil; and, a small quantity of water being added to cool, the stuff is again immersed for two hours; at the end of which time it is to be taken out, cooled, and steeped in the dye for an hour longer, being frequently turned. The cloth is then to be carried to the fulling-mill, and well scoured, till the water runs from it perfectly colourless. As soon as this operation is performed, a fresh liquor should be prepared with the necessary quantity of dyers'-weed, which is only once to be boiled, and when cool, the cloth dipped into it. This last decoction softens the texture, and renders the colour a most beautiful black. Few dyers, however, take so much pains; for they are satisfied with dipping the cloth, when blue, in a decoction of nut-galls and boiling the whole for two hours. The stuff is then washed, and after adding some copperas and logwood to the liquor, the cloth is again immersed for two hours, at the end of which it is washed, scoured, dried, and pressed.

A patent was granted to Mr. JAMES BAYLEY, of St. Leonard's, Shoreditch, dyer, for his invention of a machine for dyeing, staining, or printing handkerchiefs, &c.—The patentee employs frames of wood, brass, copper, or other metals, on the faces of which are small blocks, projecting in such a manner that, when the face of one frame is placed against that of another frame, the blocks are all exactly opposite, and correspond with each other: thus, an handkerchief, &c. being put between, and the frames fastened together, the dye will be communicated to every part of it, excepting those places which come between the blocks, and retain their original colour. These frames are provided with handles for raising them out of the copper, &c. by means of pullies; and may be put together to any number, according to the length of the article to be dyed; as they are conjoined on both sides with planks, having screws and nuts at each end, for the purpose of keeping them steady.

Another patent was lately granted to Mr. SAMUEL GREATRIX, of Manchester, for a new invented process of dyeing and staining colours upon cloth.—The process is shortly this: For dyeing black, Mr. G. takes tar, and iron liquor, adding to each gallon three quarters of a pound of fine flour, which he boils to the consistence of a paste, and then puts into a tub that forms part of a rolling-press machine, of the common construction. The goods are passed through the paste between two rollers, which diffuses it equally and completely over the whole piece. They are next dried in a hot stove, afterwards soaked in a liquor made of cow-dung and water, scalding hot in the copper, then washed and rinsed in clean water. Lastly, the goods are dyed in a decoction of sumach, madder, logwood, or other dyeing drugs, in the usual manner. The patentee also employs other mordants, such as iron liquor, paste, or gum, alum, &c.—The chief improvement in this patent, consists in employing, instead of the usual methods, a rolling-press to fix the mordant on the cloth, which renders the process somewhat of a middle kind between dyeing and calico-printing.

The art of dyeing, though in its infancy, has lately been considerably improved, in consequence of the numberless discoveries made, chiefly by French chemists. Among other useful facts, the enumeration of which would fill a volume, we shall at present only mention one, of the greatest importance to dyers. M. M. GUYTON and VAN MONS have found, by repeated experiments, that the *acid* of *wolfram* affords one of the most effectual means of precipitating the colouring matter of vegetables. The former, in particular, observed that this acid not only rendered the colour of *silks* dyed with the juice of aloe more brilliant, but also imparted to them (according to the different strength of the acid employed), a variety of shades, from the most delicate lilac to the most beautiful violet, and from the deepest orange to the most lively red. But he ingenuously adds, that, in the different trials he thus made with wool, the result did not give him equal satisfaction.

By the 1 Rich. III. c. 4, all dyers are enjoined to dye both the cloth and the list, on pain of forfeiture.—By the 3 and 4 Edw. VI. c. 2, if any cloth be dyed with archil, or with Brazil-wood, with intent to tinge either wool or cloth with a false colour, a fine of 20s. is thereby incurred.—Dyers are also obliged, by the 23 Eliz. c. 9, to affix a seal of lead to cloths, with the letter M, to shew that they are well *maddered*, or, in default thereof, they are liable to pay a fine of 3s. 4d. And if they use logwood in dyeing, they incur a fine of 20l. Severe penalties are also imposed by the 13 Geo. I. c. 24, on dyers who do not dye cloths throughout with woad, indigo, and madder, or who omit to put marks to the cloth dyed.

Among the latest publications that have appeared on this subject, we shall mention only the *Art of Dyeing*, translated from the French of Berthollet, by Mr. Hamilton (2 vols. 8vo. 12s.) published about the year 1793; and Mr. Haigh's *Dyer's Guide*, (12mo. 3s. 6d.)—For an account of the different methods of dyeing particular substances, we refer the reader to the articles, Bones, Hats, Leather, Marble, Paper, Wood, &c.

DYERS'-GREEN-WEED, or Wood-waxen, *Genista tinctoria*, L. is an indigenous plant, growing in pastures, and on the borders of corn-fields. It produces yellow flowers, which blow in the month of July or August, and are succeeded by numerous seeds.

This herb is eaten by horses, cows, sheep, and goats;—the flowers afford a yellow colour, which is preferred to every other, for dyeing wool green. This plant also yields the fine yellow lacker of painters, by boiling the stalks and leaves in lime-water, and again placing the clarified decoction over the fire, with chalk and alum.

A dram and a half of the seeds, when pulverized, operate as a mild purgative. A decoction of the whole plant is said to be diuretic, and has been given with success in cases of dropsy.

DYERS'-WEED, or Yellow-weed, *Reseda luteola*, L. an indigenous annual plant, growing in meadows, pastures, on walls, and barren uncultivated spots, particularly on the rubbish thrown out of coal-pits. It has a cylindrical, hollow, furrowed stem, and produces yellow flowers, which blow in the month of June or July. This plant is not relished by cattle, few eating it, except sheep, which sometimes browse it a little.

The dyers'-weed imparts a most beautiful yellow colour to wool, cotton, mohair, silk, and linen, and is principally used by dyers for that purpose, as it affords the brightest dye. A decoction of this plant also communicates a green colour to blue cloths, and constitutes the basis of *Dutch pink*. The tinging properties reside in the stems and roots, which should be cultivated in sandy situations; because rich soils render the stalks hollow, which consequently do not impart so delicate a colouring matter. As the durability and brightness of the colours obtained from this plant greatly depend on the circumstance, whether a just proportion of alum and cream of tartar have been used for the lye, in preparing the goods before they are dyed, we can from experience recommend *three* parts of alum to be used to *one* of tartar: if more of the former be employed, the colour will be pale; if a greater quantity of the latter, it will acquire an orange-shade.—M. GADD informs us, in the 29th vol. of the Transactions of the Swedish Academy, that he found the following proportion of ingredients to be the most practically successful in making the preparatory lixivium: viz. for one pound of wool, two ounces of alum, six drams of cream of tartar, to be dissolved in three gallons of water, to which are to be added two handfuls of wheaten bran. After remaining twelve hours in this decoction, the wool is to be taken out, rinsed, then half-dried, and afterwards boiled together with one pound of dyer's green-weed, in four gallons of water; and after it has been some time over the fire, the plants should be removed, and half an ounce of the purest pot-ash (which must contain no *lime*, like the Essex ashes) added to the liquor; when the wool must be gently agitated, till it acquire the proper shade of yellow. The colour may be heightened by an additional portion of pearl-ashes, or salt of tartar; but its durability will thus be affected.—If silk or linen are to be dyed, both the tartar and bran must be omitted, and the colouring matter fixed with alum and pot-ash: but, in woollen cloth or yarn, the permanency of the colour is remarkably promoted by the addition of wheaten bran.

DYSENTERY, or BLOODY FLUX, an infectious disease, attended with a discharge of blood and purulent matter by stool; violent gripings; a continual inclination to go to stool; pains in the loins; fever, &c.

Unwholesome night-air, damp places, and a suppression of insensible perspiration, may be considered as the principal causes of this disease; which is also, though rarely, occasioned by the immoderate eating of *unripe*, acrid fruit.—The opinions of practitioners, on the cure of the dysentery, being at great variance; one class of them proposing to cure it by bleeding and emetics (considering it as a "*rheumatism of the bowels*"); another by purgatives and astringents; a third by violent sudorifics (treating it as a "*fever of the intestines*"), we shall not detain the reader with their different notions, but briefly observe, that the treatment of the disorder chiefly depends on two circumstances: 1. Whether it be accompanied with fever; and, 2. Whether the patient be of a sanguineous temperament, and plethoric habit,—or the contrary. In both the former cases, we advise the reader not to attempt the cure of a disease which has often baffled the talent of the most learned and experienced, but immediately avail himself of medical advice, especially as the malady is contagious.

If, however, the dysentery be unattended with febrile symptoms, and the patient of a phlegmatic rather than choleric temperament, he may then take, at the commencement of the disease, a brisk emetic of a scruple or half a dram of the ipecacuanha-root in powder, and afterwards one grain of it every four or six hours: such medicine having, by experience, been found singularly efficacious. Hence, we do not venture to suggest either opium, antimonial tartar, rhubarb, or any other drug; as they can be of service only in particular cases. But the greatest advantage in this complaint will generally be derived from the application of clysters, which should consist of decoctions of the bruised ipecacuanha-root, namely, one dram boiled in a pint of water, till the third part be evaporated; or alternately, three quarters of a pint of fresh milk, in which one ounce of mutton-suet has been dissolved, should be administered luke-warm, and both repeated every six or eight hours.

The *regimen* in dysentery is of the utmost consequence. Animal food, whether solid or liquid, must be abstained from, till the violent symptoms have subsided, when chicken-broth may be allowed. The use of the salep-root in the form of jelly, and the white of an egg and starch, taken in small portions, will afford sufficient nourishment, while they tend to restore the natural and abraded mucus of the intestines. In the decline of the disease, a solution of fresh mutton-suet in hot cow's-milk, to which a little starch and sugar may be added, after the fat has been removed from the top, affords both a wholesome and palatable dish. The copious use of *ripe* grapes has, in this disease, often procured very great relief; and, though the unlimited and promiscuous eating of fruit, in every stage and species of dysentery, may not always be proper, yet, in those cases where Nature points out such indulgence, by the ardent desire of the patient, or where the blood appears to be in a broken, dissolved state, and a putrid acrimony infests the bowels, there is no danger to be apprehended from a free allowance of ripe, sub-acid fruit, which will, in general, be attended with happy effects.

E.

EAGLE, the GOLDEN, or *Falco chrysaëtos*, L. a bird of prey, which chiefly inhabits the northern parts of Britain: it weighs about twelve pounds, and is nearly three feet long; but, with its expanded wings, measures above seven feet.

These birds possess the senses of sight and smell in an uncommonly acute degree: they are also remarkable for their longevity; and their long abstinence from food. There are instances of eagles having attained an age exceeding one hundred years, and of one which existed twenty-one days without sustenance.

Eagles are very destructive to lambs, kids, fawns, and all kinds of game, especially during the breeding season, when they carry vast quantities of prey to their young. These pernicious birds are particularly mischievous in the Orkney Islands, where a law is in force, which entitles every person that kills an eagle, to a hen out of every house in the parish where such bird was killed.

EAR, the organ of hearing, or that part through which animals receive the impression of sounds.

This organ is extremely tender, and subject to a variety of disorders.

ders. If it be suffered to continue for any length of time without being cleaned, a species of wax accumulates in it; which, if not speedily removed, becomes tough and hard, diminishes the acuteness of hearing, and produces at length total deafness. An abundance of ear-wax, if thin and acrid, occasions pain, and is sometimes accompanied with a running in the ears: hence these parts should be strengthened by washing them every day with cold water; by which the sense of hearing will be considerably improved and preserved.

The most common disorder to which these organs are liable, is Deafness. Having already treated of that malady, we cannot avoid animadverting on the impropriety of employing the common *ear-trumpets*, which, though they may afford temporary aid, ultimately destroy that useful sense. Deaf persons, however, may still be enabled to receive sounds, and in a more perfect manner, through the teeth and other bones of the head, than by communicating such sounds to the ear by the common trumpet. A better method, therefore, may be attempted by means of an ivory tube, of a cylindrical form, from 12 to 24 inches in length, and from $\frac{1}{4}$ to $\frac{1}{2}$ of an inch in diameter. If it be hollow throughout, the lower extremity should be made much wider than the part placed between the front teeth, through which the necessary vibrations may thus be communicated to the internal ear.

To this may be added the distressing complaint, denominated the *ear-ach*, which usually proceeds from an inflammation, though it is sometimes occasioned by a sharp serous humour, stimulating the membrane that lines the canal of the ear: this painful affection also sometimes originates from insects that have penetrated the cavity of the ear; in which case, some sweet-oil should be introduced into the orifice, and the person ought to lie on that side of the body, the ear of which is the seat of complaint. By such means, the worm or insect may be extracted, and the pain consequently removed.

Loss of one ear is a punishment, inflicted by the 5th and 6th Edw. VI. c. 4, for fighting in a church-yard. By the 2 and 3 of the same king, c. 15, all persons who are convicted of combining and confederating together for raising the price of provisions, labour, &c. (if it be the third offence) are to lose one ear; beside being put into the pillory, and branded with perpetual infamy, or a fine of 40l.

EAR-WIG, or *Forficula auricularis*, L. a well known insect, which has received its name from penetrating into the human ear, where it causes the most acute pains, and even, as some have asserted, eventual death.

Various remedies have been applied to extract this noxious insect, such as the holding of a slice of apple to the ear; pouring of Madeira wine or brandy into that organ, &c. But the safest, and we conceive, the best remedy is, to pour olive-oil into the part affected, and to avoid on every occasion sleeping on the ground, particularly during the autumnal months.

Ear-wigs are likewise extremely destructive in gardens, especially where carnations, nuts, or filberts, pears and apples are reared. They are so peculiarly fond of the flowers first mentioned, that if they be not timely prevented, they will entirely destroy them, by consuming the sweet part at the bottoms of the petals or leaves. To prevent these depredations, the usual practice is, to put the bowl of a tobacco-pipe, or the claws of lobsters, upon the sticks supporting the flowers, because ear-wigs creep into cavities and dark places during the day. The placing of hollow reeds behind the twigs of wall-trees, has been found of considerable service, if they be examined and cleared every morning. A visit at midnight, however, is preferable, as more vermin may then be destroyed in one hour, than can be exterminated in one week by the other means; and the garden will in a short time be, in a very considerable degree, if not totally, freed from their depredations.

EARTH, in general, signifies that solid, incombustible substance which forms the basis of the globe we inhabit.

Chemists have, hitherto, made us acquainted with *eight* different species of *simple* earths, namely, 1. The *siliceous*, or flint; 2. *calcareous*, or lime; 3. *magnesian*, or talc; 4. *argillaceous*, or clay; 5. *ponderous*, or barytes (Derbyshire spar); 6. *Strontian* (from a place of that name in Scotland); 7. *Circon*, or jargon of Ceylon; and 8. *glucine earth*, very lately discovered by Vauquelin, and also called *sweet earth of beryl*.—We cannot enter into an analysis of the different earths here enumerated, and shall, therefore, content ourselves with stating, that *simple earths* are rarely found in a state of purity; that all the strata of rocks (which compose in a manner "the shell of this globe," on the surface of which the vegetable mould is immediately incumbent) principally consist of *siliceous, argillaceous, calcareous*, or other compound earths derived from the primitive kinds before specified; that stones are only earths in an indurated state; that the characteristic difference between earths and alkalis arises from the insolubility of the former, while the latter may be dissolved in water or other fluids; and, lastly, that most of these earths unite with acids, and neutralize them, like alkalis.

As we treat of those species of *earth*, which may be usefully employed in domestic economy, under their respective heads of the alphabet (see Clay, Flint, Lime, &c.), we cannot in this place enlarge upon the subject.

EARTH-BANKS, in husbandry, are a kind of fence, very common in the vicinity of London, and in several other parts of England: where stones cannot easily be procured, they are preferable to other fences, both for soundness and durability.

The best method of making earth-banks is, to dig up some turfs in a spot abounding with grass, about a spit deep, and four or five inches thick: these are to be laid even on one side by a line, with the grass outwards, and on the back of them is to be placed another row of turf, leaving the space of one foot of solid ground on the outside, to prevent the bank from slipping in, lest any part of it should be deficient. On the outside of this, a ditch is to be dug; otherwise both the sides must be made with a slope two feet in depth, which, however, will be no detriment, as they will both produce pasture.

The soil dug out of the ditches, or from the slopes, should be thrown in between the two rows of turf, till the whole is made level, in a similar manner, and the bank is raised to the height of four or more feet, at the same time increasing the width of the foundation, in proportion to the height. As the bank ascends, both sides must be made to slope internally, so that the top shall be about 2½ feet in width.

There is one caution necessary to be observed in constructing this kind of fence; that is, never to raise it during very dry seasons, because, if violent rains should follow, the earth contained between the sods would swell, burst out, and destroy the beauty and solidity of the bank. The top may be planted with quick, which, if repeatedly clipped, will grow very thick, and afford excellent shelter for cattle.

EARTH-NUT, a native plant of two species, namely, the *Bunium bulbocastanum*, or GREAT EARTH-NUT; and the *flexuosum*, or COMMON EARTH-NUT, or Pig-nut. Both are perennial plants, growing in sandy or gravelly meadows, pastures, orchards, and woods: they flower in the month of May or June.

The roots of these plants are at present searched for only by hogs, which devour them with avidity; but as they are very little inferior to chesnuts, we think they might form an agreeable addition to our winter desserts, and be eaten either raw, boiled, or roasted.

EARTHQUAKE, is a sudden and violent concussion of the earth, which is generally attended with uncommon noise, both in the air and under ground; in consequence of which, whole cities are at once levelled, as well as rocks; the course of rivers is altered; and the most dreadful devastations are thus occasioned.

There is no phenomenon in nature, more calculated to impress the human mind with awe, than an earthquake; but it has not till lately been investigated with philosophical precision, and the history of these events still remains very incomplete.

Of the observations, which indefatigable naturalists have been able to collect, the following are the principal: 1. Where there are any volcanoes or burning mountains, earthquakes may naturally be expected to occur more frequently than in other countries. 2. Earthquakes are, in general, preceded by long droughts; but they do not always happen immediately after them. 3. They are likewise frequently indicated by certain electrical appearances in the atmosphere, namely, the *aurora borealis*, the falling of stars, &c. 4. A short time previous to the shock, the sea swells, with a loud noise; fountains are disturbed, and become muddy; and the irrational animals appear frightened, as if conscious of approaching calamity. 5. The air, at the time of the shock, is in general very calm and serene; but afterwards becomes dark and cloudy. 6. The concussion begins with a rumbling noise, similar to that of carriages: a rushing sound resembling the wind is sometimes heard; at others, explosions not unlike the firing of cannon; and the ground is agitated in different directions. A single shock seldom exceeds a minute in its duration; but frequent concussions succeed each other, at short intervals, for a considerable length of time. 7. During the shock, chasms are made in the earth; whence flames, but oftener vast quantities of water, are discharged. Flames and smoke are also emitted from spots of ground where no chasms are perceptible; and though the abysses formed in the earth are in general not extensive, yet in violent earthquakes they are frequently so large as to bury whole cities. 8. The water of the ocean is, on such occasions, affected perhaps still more than the land; the sea now rising to a prodigious height, now divided to a considerable depth, and emitting great quantities of air, flames, and smoke. Similar agitations occur in the waters of ponds, lakes, and even rivers.

Lastly, the effects of earthquakes are not confined to one particular district or country, and frequently extend to very distant regions; though there is no instance of the whole globe having been convulsed at the same time.

The cause of earthquakes, or the theory of this tremendous phenomenon, is but imperfectly understood. It is, however, certain, that they arise from the confinement of air within the bowels of the earth, where it is generated by sulphureous vapours acting on different metallic ores, the principal and most copious of which appears to be *iron*. In confirmation of this theory, we shall only observe, that *artificial earthquakes* may be easily produced, by burying equal quantities of iron-filings and sulphur, mixed in a moist state, and confined in a vessel, so as to exclude the access of external air, and prevent the escape of the inflammable gas thus generated. In a few days (and, if large quantities be employed, in a few hours) this composition grows remarkably hot, and will explode with a violence and impetuosity resembling the natural phenomenon:—but we do not advise our junior readers to attempt such dangerous experiments. As it would be deviating from our plan to enter into farther particulars, we can only refer the inquisitive to the 73d vol. of the "*Philosophical Transactions*" of the Royal Society for 1783, where they will find an ample account of the latest and most awful earthquake that has happened in Europe, within the memory of man.

EARTH-WORM, or *Lumbricus*, L. a well known insect, which is destitute of feet; it is of an oblong form; round shape, and covered with a soft, slender skin, marked with annular ridges and furrows. It is common in all parts of this country, at little depths beneath the surface of the earth; and is not unfrequently found in the human intestines, as well as in those of the lower animals; in which state it has been supposed to be a different creature, and is therefore called by various names.—See WORMS.

Earth-worms were formerly reputed to be of great virtue in medicine; but are at present more usefully employed in feeding poultry and other birds.

EAU-DE-LUCE, a kind of liquid volatile soap, of a strong pungent smell, which is prepared in the following manner: Ten or twelve grains of white soap are dissolved in four ounces of rectified spirit of wine; after which the solution is strained. A dram of rectified oil of amber is then added, and the whole filtrated: with this solution should be mixed such a proportion of the strongest volatile spirit of sal-ammoniac, in a crystal glass bottle, as will, when sufficiently shaken, produce a beautiful milk-white liquor. If a kind of cream should settle on the surface, it will be requisite to add a small quantity of the spirituous solution of soap.—Those who may wish to have this liquor perfumed, may employ lavender, or Hungary water, instead of the spirit of wine.

This celebrated composition is, however, seldom obtained in a genuine state, when purchased at the shops. Its use, as an external remedy, is very extensive; for it has not only been employed for curing the bites of vipers, wasps, bees, gnats, ants, and other insects, but also for burns, and even the bite of a mad dog, though not always with uniform success. Besides, it affords one of the safest stimulants in cases of suffocation from mephitic vapours, and in that state of apoplexy (which see) termed *serous*, as likewise after excessive intoxication, and in all those paralytic complaints, where the vessels of the skin, or the muscular fibre, require to be excited into action. Nevertheless, it ought to be used with due precaution.

EBONY, an exceedingly hard and heavy wood, imported from the East Indies: it admits of being very highly polished, for which reason it is used chiefly for veneering cabinets, in Mosaic work, &c.

Ebony is of various colours, namely, black, red, and green; but the first is that most generally known and used. Cabinet-makers, inlayers, and others, frequently substitute pear-tree, and other wood, for ebony, by giving the former a black colour; which some effect by washing it in a hot decoction of gall-nuts, and after it is dry, by rubbing it over with ink, and polishing it by means of a hard brush and a little wax: others heat, or almost burn their wood till it become black, so that it acquires such a degree of hardness, that, when properly polished, it can with difficulty be distinguished from genuine ebony.

ECONOMY, a term of extensive signification, and if its meaning be properly understood and practised, the result cannot fail to be attended with the happiest effects. It is, in particular, applied to *rural, domestic, animal, political*, and other objects, but more generally to the two first mentioned, which form the basis of the present work.

As, by our plan, we are confined to the alphabetical order, in which the different subjects of economy are discussed, according to their greater or less importance, we cannot, consistently, enlarge upon its *theory*. Those readers who are seriously inclined to adopt *practicable* rules of economy and frugality, will consult the particular articles connected with these measures: others, who wish to acquire more extensive information on rural and domestic economy in general, will be highly gratified by the perusal of Mr. J. BANNISTER's *Synopsis of Husbandry* (8vo. 9s. 1800), and especially the collection of the *Reports of the Society for bettering the Condition of the Poor*; a work which merits a place in every family library.

EDGED TOOLS: See TOOLS.

EDIFICES: See BUILDING; COUNTRY-houses; and FARM-house.

EDUCATION, is the art of rearing, forming, and instructing children, according to the most appropriate rules and maxims.—

Many volumes have, from time to time, been published on this most important subject; and though almost every writer aims at giving to the public a system peculiar to himself, yet all agree that the grand object of education is the *gradual improvement of our moral, physical, and intellectual faculties.*—Thus it happens, that the *means* to be adopted for attaining this salutary end, constitute all the difference of opinion prevailing among men. It would lead us too far from our limits, to lay down only the general principles by which a good and rational education ought to be regulated. And as this subject has lately been investigated by the Editor of these pages, in the Preliminary Lectures to Doctor STRUVE's *Familiar Treatise on Education*; besides which, there have been published several useful works, that are briefly reviewed in those lectures; the curious reader will probably avail himself of the original sources, from which we have no room to insert copious extracts.

EEL, or *Murœna*, L. a genus of fish, comprising seven species, two of which only are found in the waters of this country; namely,

1. The *Anguilla*, or Common Eel, which is very frequent in all our fresh waters, ponds, ditches, and rivers. This is a very singular creature, and in some respects partakes of the nature of reptiles; being known to quit its element, and to wander during the night along the meadows, both to change its habitation, and to obtain prey; feeding on snails as it glides along. During winter, the common eel buries itself deeply in the mud, where it continues in a torpid state, similar to that of serpents. It is extremely sensible of cold, and will eagerly take shelter in a wisp of straw thrown into a pond in severe weather, which stratagem has been successfully practised to catch these fish during the winter season.

Eels are exceedingly voracious, and destructive to the fry of other fish; and are remarkable for their tenacity of life, as their dissevered parts move for a considerable time after they are flayed. Common eels grow to a large size, sometimes weighing 15 or 20lbs.; but are, in general, from $1\frac{1}{2}$ to 2 feet in length.—Their fat is reputed to be vulnerary, and has been recommended externally in cases of deafness, and in the hemorrhoids.—When this fish is half fried, and its fat carefully expressed and clarified, the *oil of eels* is the most subtle for watches, and other diminutive machinery; as it never thickens, and consequently preserves the iron from the effects of rust.

2. The *Conger*, or CONGER-EEL, grows to an uncommon size, and is found chiefly on the coast of Cornwall, where great numbers of it are taken, and when slit, are hung on a frame to dry, and then exported. Conger-eels are sometimes 100lb. in weight, and extremely voracious, preying on other fish, as well as on crabs, when these have cast their shells, and are in a soft state.—Being exceedingly fond of carcasses of any kind, their flesh, though difficult of digestion, is very agreeable, and in great request among epicures. Persons afflicted with nervous, asthmatic, and consumptive disorders, ought, however, carefully to abstain from eel-pies, or any dishes prepared of that luxurious fish.

EGG, a body formed in certain female animals, and which contains an embryo or fetus, beneath a cortical surface, or shell. This shell is lined throughout with a thin, but tough membrane, which, dividing at or near the obtuse end of the egg, forms a small bag, and contains what is called the *albumen*, or white, and the *vitellus*, or yolk.

The chick in the egg is first nourished by the white, and when that is consumed, by the yolk.—A short time before the exclusion of the animal, the whole of the yolk is taken into its abdomen, and the shell, at the obtuse end, frequently appears cracked, which is occasioned by the instinctive operation of the beak.

Eggs vary much in their colour, size, and form, according to the birds that deposit them, and the different modes of dressing them. Those chiefly used for culinary purposes are the new laid eggs of hens, being without exception the most wholesome.

Eggs are an agreeable and nourishing food; but they ought to be perfectly fresh, and gradually coagulated in hot water, from 5 to 10 minutes, instead of being boiled. To ascertain whether they have been well preserved, it is only necessary to examine their transparency by a candle, and to reject all such as appear of a turbid colour: fresh eggs also, on being exposed to the fire, will exhale a perceptible moisture.

Among the various methods contrived, of preserving eggs for the winter-season, the chief requisite is to exclude every access to the air. For this purpose, solutions of lime, with the addition of alkalis, have been employed; but these, as well as the varnishing of eggs with wax, are too expensive for general use. The greasing of eggs with unctuous substances, such as mutton fat, oil, &c. has also been practised; but it is neither cleanly, nor calculated to effect the object intended. One of the best methods, seems to be that of covering the eggs with a cheap varnish, by which the air will be prevented from penetrating the pores; or of suspending them in running water, by means of a net.

The shells of eggs serve for various purposes, but chiefly as a colour; when finely levigated, they are preferred to flake-white. They are prepared by peeling off the inner skin, and after being finely pulverized, the powder is carefully washed.—See Colour-making, vol. ii. p. 36.

The yolks of eggs are employed in different medicinal ways, but most frequently in emulsions. One yolk, if gradually beaten up with three ounces of pure water, and reduced to the utmost degree of thinness, has been found of great utility in removing contractions of the limbs. The whites are chiefly applied externally, in the preparation of eye-waters, on account of their cooling, agglutinating, and astringent qualities. They have also been used with advantage, in burns, and are recommended as a specific for the jaundice, of which we have had no experience.

ELDER, or *Sambucus*, L. a genus of plants consisting of 6 species, two of which are indigenous.

1. The *Ebulus*, Dwarf Elder, or Dane-wort, which is perennial, grows in hedges and on road sides, and flowers in the month of July. The green leaves of this plant are said to expel mice from granaries: neither hogs, cows, goats, sheep, nor horses will eat them.—Its ber-

ries impart a violet colour, and their juice mixed with vinegar dyes raw linen, as well as morocco leather, of an azure blue.—In its medicinal effects it is more violent than the following species, and therefore requires greater caution.

2. The *nigra*, or Common Elder, which thrives in woods, and damp hedges. In May or June it produces white flowers, which are succeeded by black berries.—This plant is extensively useful: its wood being hard and tough, is made into meat-skewers, tops for angling rods, and needles for weaving nets; it is also employed by turners, as it works extremely well on the lathe.—The leaves are eaten by sheep, to which it is of great service, when diseased with the rot; for, if placed in a situation where they can easily reach the bark and young shoots, they will speedily cure themselves. According to Linnæus, the plant is refused by horses, cows, and goats, though others assert, that cows eat it eagerly.

Every part of this, as well as of the preceding species, has a narcotic smell, which ought to caution persons against sleeping beneath its shade.—The inner green bark is an ingredient in the black dye; it is likewise purgative, and may be used with advantage where strong laxatives become requisite. In small doses it is diuretic, and has been successfully used in glandular obstructions, and in dropsies. The leaves are possessed of cathartic properties similar to those of the bark, but are more nauseous. They form an ingredient in several cooling ointments: and if turnips, cabbages, fruit-trees, or corn, be whipped with them, and also with the green boughs, they will be effectually secured against the depredations of turnip-flies, caterpillars, and other noxious insects, with which those vegetables are infested.—The flowers are sometimes infused to impart a flavour to vinegar; but should on no account be given to turkies, as they will prove fatal to those birds.—The berries are likewise poisonous to poultry; but their juice, when boiled down to an extract, and sweetened with sugar (this composition being termed *rob)*, is a gentle aperient, and promotes perspiration. The juice is likewise converted into a pleasant liquor called *elder-wine*, and is also employed to communicate a red colour to raisin or sweet wines.—Dambourney observes, that linen may be dyed of a brown colour with the juice of these berries; and that wool, previously managed with bismuth, acquires a beautiful blueish grey, which is very permanent.—In Germany, a very pure and strong spirit is distilled from this fruit, especially after it has been sweetened by night-frosts.

On the trunk of the common elder frequently appears a fungous excrescence, wrinkled, and turned up like an ear, whitish on the outside, black within, and intersected with several small veins.—These are commonly called *Jew's ears*, and are reputed to be serviceable for inflammations and swellings of the tonsils; for sore throats, and quinsies.

ELECAMPANE, or *Inula*, L. a genus of plants, consisting of thirty species, of which four only are indigenous, and the principal of these is the *Helenium*, or Common Elecampane; which is perennial, abounds in moist meadows and pastures, and flowers in July or

August. It is eaten by horses and goats, but refused by hogs:—its roots, when bruised and macerated in urine with balls of ashes and whortle-berries, dye a blue colour: when dry, they possess an aromatic smell, and, on chewing them, become acrid and pungent: they are likewise in some repute for promoting expectorations in asthmas and coughs. If liberally taken, they are diuretic, and said to be of great service in removing visceral obstructions.—A decoction of this plant has been employed by farmers for the cure of the scab in sheep; and, externally applied, for removing disorders of the skin.—Prof. KNACKSTAEDT, of St. Petersburgh, has lately prescribed the elecampane both ways, and found it a remedy of singular efficacy, in curing the scald head, itch, &c.

ELECTRICITY, is the power of attracting light substances, &c. when excited by heat, or friction; and which may be communicated to other bodies. This term also implies that branch of natural philosophy which investigates the nature and effects of this power, and of other elementary agents connected with it.

The science of electricity has made a most rapid progress within the last fifty years; it was little attended to previous to the year 1600, since which period it has been carried to a considerable degree of perfection.—It would be transgressing our limits to enter into the history of this subject, as few can be ignorant of the names of NEWTON, GREY, DE FAY, PRIESTLEY, FRANKLIN, and CAVALLO: farther, as the theory is too diffuse, and requires the aid of too many experiments and analytical explanations, we shall confine our account to *medical electricity*. This has often been successfully employed for relieving the human frame from painful maladies, though it has till lately been treated as an empirical process. Being one of the most powerful stimulants, its effects may be considered both as general and local. When the vital principle is in a manner extinguished by too violent shocks, it may again be kindled or excited by such as are less powerful. Hence electricity promotes a free circulation of the fluids, and particularly the blood; increases animal heat, perspiration, as well as all the secretions and excretions of the body.

As many *professional electricians* are little concerned about the propriety or safety of this potent remedy, when patients apply to them as candidates for the operation, we think it our duty to give the following practical hints: 1. Electricity is always improper in active, inflammatory, or *sthenic* diseases: 2. It is also hurtful when a high degree of excitement is felt in the organs of sense, as well as in those of voluntary motion, and when both are accompanied with relaxation or debility: 3. If any local irritation prevail in the body, such as ulcers, inflammatory tumors, eruptions of the skin, &c. In these cases, the electric stimulus has a direct tendency to produce congestions, or a local accumulation of humours. It has, however, sometimes been found highly beneficial in removing the periodical obstructions of females, though its application requires great precaution. In passive, chronical, or *asthenic* disorders, it has likewise been of considerable service; but the mode of imparting the electric fluid deserves more attention than has, in general, hitherto been bestowed upon it; and violent shocks, for the sake of experiment, ought never to be communicated, where less powerful ones might be sufficient. Thus, the *electric bath*, and the gentle application of sparks to any particular part of the body, under the conditions before stated, are equally safe, and advantageous. On the contrary, the more violent methods of electrifying have so often been attended with mischievous effects, that they ought to be applied to those persons only, whose capacity of receiving external impressions is diminished, and whose excitability is in a languid state.

Deafness, paralysis, head, and tooth-achs, however obstinate, have frequently yielded to the powerful effects of electricity. Similar success has attended its application to parts affected with the cramp, gouty and rheumatic pains, palsy, and sometimes even epilepsy; besides which, moderate electric shocks have, in various instances, contributed to the resuscitation of persons whose vital functions were destroyed by drowning: it ought, nevertheless, to be resorted to only in particular cases, and under the immediate inspection of a medical practitioner.

For an account of the different medical apparatus employed, and the various modes of electrifying, we refer the curious reader to the late Mr. ADAMS's "*Essays on Electricity and Magnetism*," (8vo. 9s.) He will also find much valuable information in Dr. PRIESTLEY's "*History of Electricity*," (4to. 1775, or 2 vols. 8vo. 1l. 1s.) and in Mr. CAVALLO's "*Treatise on Electricity*," 3 vols. 8vo. 18s.

ELECTUARY, a form of medicine, consisting of powders, or other ingredients, incorporated with honey, conserve, or syrup: it is divided into doses, to be taken as circumstances may require.

Electuaries are composed principally of the milder medicines, which are more pleasing to the palate. The more powerful drugs, as emetics, opiates, &c. are seldom administered in this form, on account of the uncertainty of the dose. Acrid, bitter, and fetid substances, should never be given as electuaries; nor is this form well calculated for mercurial, and other ponderous matters, which are apt to subside.

The lighter powders require thrice their weight of honey, or syrup boiled to the consistence of that drug, in order to convert them into an electuary.—If syrups of the common consistence be employed, double their weight to that of the powder will be sufficient. A very cheap and excellent substitute for either sugar or syrup in making electuaries, might be obtained by baking unripe pears in close vessels, with the addition of a little soft sugar, by which means a considerable portion of saccharine juice may be readily obtained.

The quantity of an electuary, to be administered at one dose, varies according to its component parts; but it seldom exceeds a large tea-spoonful, or two drams.

ELEPHANT, a well known animal, which is a native of India, and the southern parts of Africa. It is the largest of all quadrupeds, and generally about 16 feet in length from the front to the tail; 25 feet from the end of the trunk, and about 14 feet high. It has no fore-teeth in either jaw; but its dog-teeth are very long, and afford the beautiful ivory, which is converted into combs and other useful articles. It is also provided with a long pliable proboscis, or snout, with which it can seize any objects, and also convey its liquid nutriment to the mouth.

Elephants are remarkable for their uncommon sagacity, as well as their social disposition. When tamed, they are the most friendly of all animals, and can easily distinguish their master's or driver's voice. They are sensible of the language of anger, of command, and of satisfaction, so that they act accordingly. They receive orders with attention, and execute them with precision and alacrity, bowing themselves for the convenience of those who wish to mount them; raising burthens with their trunk; and laying them on their back. These animals delight in shining harness and trappings; though, when yoked in a cart or waggon, they draw cheerfully, unless abused by unjust chastisement, in which case they seldom fail to take vengeance on their tyrannical master.

If the elephant be properly managed, he attains a very considerable age; even though employed in servitude and labour. Several instances have occurred, in which these creatures have reached the age of 130 years in captivity; and, in a natural state, they often exceed 200 years: their full growth is said to require not less than 30 years.—The flesh, gall, skin, and bones of elephants, are used medicinally by the Chinese.—See also Ivory.

Elixir: See Tincture.

ELM-TREE, the Common, or *Ulmus campestris*, L. an indigenous tree, growing chiefly in a loose soil of hedge-rows, and abounding in the more southern parts of this country;—its flowers have a pleasant smell, similar to that of violets, and blow in the month of April.

This wood may be propagated by the seed, and by layers or suckers taken from the roots of old trees: those raised from layers, always strike better roots, thrive more quickly than the other, and do not shoot forth so many suckers; for which reason this method deserves to be more generally practised.

The elm naturally delights in a stiff, strong soil; where it grows comparatively slow; but if it be planted in rich, light land, it vegetates most luxuriantly. In the latter case, however, its wood is light, porous, and of little value, compared with that produced on richer soils: the latter is of a closer and stronger texture, and possesses near the heart, the colour and almost the weight and hardness of iron. On such lands, therefore, the elm becomes very profitable, and is one of those deciduous trees, which ought to be industriously cultivated.

This beautiful tree is of great value; and well adapted for planting shady walks, as it does not destroy the grass, and its leaves are relished by horses, cows, goats, hogs, and sheep, all of which eat them eagerly. Its wood, being hard and tough, is used for making axle-trees, mill-wheels, keels of boats, chairs, and coffins: it is also frequently changed by art, so as completely to resemble mahogany; for this purpose, it is sawed into thick planks, stained with aqua-fortis, and rubbed over with a tincture, of which alkanet, aloes, and spirit of wine, are the principal ingredients.

This plant affords subsistence to a variety of insects that prey upon it, but more particularly to the *aphis* of the elm, which generally causes the leaves to curl, so as to make them a secure shelter against the weather. No effectual method of extirpating them has hitherto been devised.—Silk-worms devour the leaves with great avidity; and, though we doubt whether they afford wholesome food to these insects, yet when alternately given or mixed with lettuce, elm-leaves may become an useful substitute, in situations where the mulberry-tree is scarce.

A decoction of the inner bark of the elm-tree, if drunk freely, has sometimes procured relief in inveterate dropsies. It has a bitterish taste, and abounds with a slimy juice, which is recommended in nephritic cases, and also externally as an useful application to burns. The outer bark is bitter, contains but little mucilage, and is totally destitute both of smell and taste. The internal bark of the branches is more bitter than that of the trunk, and is, probably on that account, more efficacious.—It is chiefly used for cutaneous complaints, such as the herpes, or shingles, and the leprosy.

Dambourney obtained from the bark of this tree a yellow-brownish colour in dyeing; and De Vilette manufactured of it a strong brown paper.

ELOCUTION, generally speaking, signifies the selecting and adapting of words and sentences, to the things or sentiments intended to be expressed. It is also used to denote the just and graceful management of the voice, countenance, and gesture, when speaking: in which sense it is synonimous with what is variously called a good delivery, eloquence, or the art of speaking and writing with accuracy, elegance, and perspicuity.

True eloquence depends principally on the vivacity of the imagination; for it not only communicates grace and ornament, but also life and motion to discourse. It would be deviating from our plan, to specify the various component parts of elocution, viz. emphasis, pauses, tones, &c. we must, therefore, refer the reader to Mr. Sheridan's "*Lectures on Elocution*," (8vo. 7s.) and to Mr. Walker's "*Elements of Elocution*," (8vo. 2 vols. 12s.) in the latter of which, in particular, he will find excellent and perspicuous rules concerning this subject.—Many pertinent observations on the elocution or eloquence of the bar, are contained in the elegant work, intitled, "*The Study and the Practice of the Law considered in their various relations to Society*," (8vo. 6s.)—Some judicious remarks on the eloquence of the pulpit, in this country, occur in an essay on this subject, prefixed to "*Select Sermons*," translated from the French of Bossuet (12mo. 3s.) and which, it is supposed, come from the elegant pen of Mr. Jerningham.

Embankment: *vid.* Sea.

EMBROIDERY, a work in gold, silver, or silk-thread, wrought by the needle upon cloth, stuffs, or muslin, into various figures.

In the embroidery of stuffs, the work is performed in a frame, as the easy manner of working them depends upon the proper expansion of the piece. Muslin is spread upon a pattern, on which the figures intended to be wrought, are delineated. Embroidery on the loom is less tedious than the other method, in which, while the flowers are working, it becomes necessary to count all the threads of the muslin; this latter mode, however, is much richer in points, and is likewise susceptible of greater variety. Cloths which are milled too much, will not easily admit of such ornament. The thinnest and finest muslins only are left for this purpose, and are embroidered to the greatest perfection in Saxony. Of late years, this work has been attempted in England and Scotland; but it has not yet arrived at that degree of perfection to which it has been carried in France and Germany.

There are various kinds of embroidery, namely, 1. Embroidery on the *stamp*; where the figures are raised and *rounded*, cotton or parchment being placed beneath, in order to support them. 2. *Low* embroidery; in which the silver or gold *lies low* upon the sketch or pattern, and is stitched with silk of the same colour. 3. *Guimped* embroidery, which is performed either in gold or silver: a design is first made upon the cloth, and then placed on cut vellum; after which the gold or silver is sown on with silk-thread. 4. Embroidery *on both sides*; which is thus denominated, from its appearing on both sides of the stuff. 5. *Plain* embroidery; where the figures are flat and even, being totally destitute of ornaments.

By the statute 22 Geo. II. c. 36, no foreign embroidery, or gold or silver brocade, shall be imported, on pain of being forfeited and burnt, and a fine of 100l. for every piece. Nor shall any person sell or expose to sale, any foreign embroidery, gold, or silver thread, lace, fringe, brocade, &c. or make the same up into any garment, on pain of having it forfeited and burnt, and of paying a penalty of 100l.: the mercer, or other person in whose custody it may be found, incurs a similar fine.

EMERALD, a genus of precious stones belonging to the order of *siliceous* earths. This is perhaps the most beautiful of all the gems: when heated in fire, it changes its colours to a deep blue, and becomes phosphorescent; it resumes its natural green on growing cold.

Emeralds are divided by jewellers into two classes or kinds, namely, the *oriental* and the *occidental*. The former is at present extremely scarce, being found only in the kingdom of Cambay, in India. The *occidental* emeralds are chiefly imported from Peru, in South America. A very inferior sort is also obtained from Silesia, which, however, is little esteemed.

Genuine emeralds being seldom to be met with, several experiments have been made, and directions given for imitating them; from which we select the following: Take of natural crystal and of red lead, each 4 ounces; verdigrease 48 grains; and of crocus martis, prepared with vinegar, 8 grains. The whole is to be finely pulverized, sifted, and put into a crucible, the space of one inch being left empty. It is then to be well luted, set in a potter's furnace, and left for the same space of time as earthen ware. When cool, the crucible is to be broken, and these ingredients will be found converted into a mass of a fine emerald colour; which, after being properly cut and set in gold, will at least be equal, if not superior, to genuine oriental emeralds.

EMERY, a kind of metallic stone, found in several mines, but chiefly in those of iron, being a species of rich iron ore. It is usually of a dusky, brownish red on the surface; but, when broken, is of a fine bright reddish iron-grey, spangled with glittering specks; which are in a considerable degree impregnated with that metal. It is also sometimes red, when it usually contains veins of gold.

This stone, or ore, is divided into three sorts, namely, the *Spanish*, the *red*, and the *common* emery. The first is found in the gold mines of Peru, and is interspersed with small veins and specks of gold; whence it is conjectured to be a kind of ore of that rich metal, and is prohibited to be exported. From the experiments made by naturalists, it appears to be the metal called PLATINA, to which we refer The *red* emery is discovered in copper-mines, chiefly in Denmark and Sweden; whence a small quantity is imported. The *common* emery is dug up in great abundance in the island of Guernsey. It is also obtained from some iron-mines in England, and is the only sort which is consumed in very considerable quantities by locksmiths, glaziers, lapidaries, masons, cutlers, and others, who employ it for cutting and polishing glass, marble, and precious stones; as well as for the polishing and burnishing of articles made of iron and steel. This species of emery is of a brownish colour, inclining to red; is extremely hard, and consequently very difficult to be reduced to powder; an art which has been discovered in this country, and is effected by means of certain mills, invented for the purpose: when pulverized, it forms a considerable article of exportation. This native ore, when fused with lead or iron, possesses the property of hardening those metals. It is also said to increase the weight, and heighten the colour of gold.—It deserves no notice either as an internal medicine, or as a dentrifice.

EMETICS are those medicines which are either given with a view to discharge the foul or poisoned contents of the stomach, or to vellicate the coats of that organ, and thus to produce certain changes in other parts of the animal economy, not immediately connected with the process of digestion. With the latter intention, small nauseating doses are generally administered, especially in catarrhal and other diseases of the breast. In this place, however, we shall but briefly enumerate the cases in which vomiting may be excited with a probability of success; and also, those instances in which this remedy cannot be safely adopted.

Emetics may be of great service: 1. Immediately after swallowing narcotic and other poisons (see Antidotes, vol. i. p. 75); 2. For the purpose of evacuating viscid, bilious, and putrid matters, or undigested food from the stomach; 3. To assist Nature, when there is a spontaneous effort to vomit; 4. To expel substances fallen into and obstructing the passage of the gullet; 5. To promote the expectoration of mucus and purulent matter, collected in the lungs and windpipe;—as well as on many other occasions.

On the contrary, the greatest precaution is required in the following cases, where a precipitate use of emetics may be attended with fatal effects, from bursting a blood vessel, &c. 1. In all plethoric persons, but especially such as perceive a strong propulsion of the blood to the head, breast, stomach, or liver; 2. In actual inflammation of the intestines; 3. In states of extreme languor and debility; 4. In every species of ruptures, and prolapses; 5. In violent pain proceeding from stones confined in the bilious or urinary passages; 6. In obstructions of the bowels, and other abdominal parts; 7. In persons of very rigid fibres, for instance, the aged and emaciated; 8. In a very weak or affected state of the lungs, liver and stomach; 9. In a deformed structure of the body, or some particular parts; for which reason emetics might prove dangerous to persons troubled with a hump-back, a very short neck, narrow chest, &c.

Having stated the principal circumstances, which either indicate or prohibit the taking of emetics, we trust the reader will agree with us, that they are potent remedies, and that it requires the judgment of an expert medical practitioner to determine their utility.

With respect to the different substances employed to induce vomiting, we refer to those heads of the alphabet under which they are treated, such as IPECACUANHA, TARTAR Emetic, &c.—One of the mildest emetics may be made, according to Dr. LIND, by plunging red-hot pebbles into weak wine, or flint glass thus heated into cold water; a tea-spoonful of either may be taken every five or ten minutes, till it produces the desired effect.—Another easy way to induce vomiting, is, a strong infusion of green tea, drunk lukewarm, without milk or sugar, and assisted by the occasional irritation of the fauces and larynx, by means of a soft feather.—See VOMITING.

EMOLLIENTS are those medicines which are supposed to soften and relax the fibres of the body, either by mechanically distending such as before were too closely, that is, preternaturally combined; or, by penetrating into the interstices of the elementary fibres, and supplying those particles, from a deficiency of which they were too intimately united. Among the remedies of the former class are chiefly *heat*, and all unctuous applications; such as lard, wax, fat of venison, &c.: to the latter belong all juicy, mucilaginous, and saccharine substances, serving both as nutriment and medicines. Of this description are the expressed vegetable oils, fresh butter, decoctions of the marsh-mallows, infusions of linseed, &c.

Emollients are indicated: 1. When the fibres are in too rigid a state; 2. When they are spasmodically contracted; 3. In all active inflammations; and 4. In obstinate costiveness, or accumulations of feces in the intestines.

EMULSION, a form of medicine resembling milk, and which is often prescribed with a view to sheath and neutralize acrid humours, especially in heat of urine and stranguries, as well as for nervous and irritable habits in general.

Emulsions are frequently made, by boiling the oily and farinaceous seeds contained in kernels; in which case they are soon decomposed, on standing. In short, we cannot even approve of *almond-milk*, as it soon becomes rancid in summer, and is, upon the whole, inferior to emulsions made of gum-arabic, or merely of decoctions of pearl-barley, blanched oats, wheat, rice, &c.—If these simple medicines are expected to be productive of any advantage, they ought to be taken in draughts,

draughts; amounting at least to half a pint every hour, rather cool than lookwarm (to save the stomach from relaxation), and to be continued for several days, without eating animal food. In hot weather, or where no objection to acids prevails, a table-spoonful of lemon-juice, or good vinegar, may be added to every draught of the emulsion.

ENAMEL, in general, signifies a vitrefied matter, interspersed with some solid substance; and possessing all the properties of glass, excepting that of transparency.

The basis of enamels is a pure crystal glass or frit, ground together with a fine calx of lead and tin, prepared for that purpose, with the addition of a small proportion of the white salt of tartar. These form the principal ingredients of all enamels, which are made by adding various pulverized colours, and thoroughly incorporating the whole in a furnace. For white enamel, it is sufficient to add manganese to the matter which constitutes the basis; for azure, zaffre mixed with calx of brass; for green, calx of brass with scales of iron, or crocus martis; for black, zaffre with manganese or crocus martis, or manganese with tartar; for red, manganese, or calx of copper with red tartar; for purple, manganese with calx of brass; for yellow, tartar and manganese; lastly, for violet coloured enamel, manganese with brass, that has been three times calcined.

Enamels are used either for the counterfeiting or imitating of precious stones, and for painting; or by enamellers and artists working in gold, silver, and other metals.—That species of enamel which jewellers employ, is imported from Holland, or Venice, in small cakes of various sizes, which are in general about 4 inches in diameter, and have the mark of the maker indented on them. It pays a duty of 3s. 8d. per pound on importation; and is allowed a drawback of 1s. 6d. per lb. on being again exported.

Enamelling, is the art of laying enamel upon metals, such as gold, silver, copper, &c. whether plain or painted. The latter process is performed on plates of gold or silver, but generally on those of copper, prepared with the white enamel; on which certain objects are delineated with the colours, and afterwards burnt in the fire, where they acquire a brightness and lustre resembling glass.

Painting in enamel is held in greater estimation than any other branch of that art; on account of its peculiar and permanent vivacity, the strength of its colours not being effaced by time, but always retaining their pristine splendour. It is chiefly employed in miniature, as it cannot be easily performed on a large scale; the enamel being very liable to crack on a plain surface, so that even the smallest plates must be somewhat of a convex form.

ENCYCLOPÆDIA, or Cyclopaedia, signifies the circle, or chain, which connects the different arts and sciences.

In the present work, we have preferably adopted the term "Encyclopædia," for reasons which the philological reader will easily discover. But upon the motives which have induced us to combine this word with the epithet "Domestic," we cannot in this place expatiate; as such an account will appear with more propriety in a future preface.

Many attempts have been made by writers, to reduce the whole circle of the arts and sciences to a systematic order, and exhibit a connected view of them, by representing what has emphatically been called "*The Tree of Knowledge*;" but we confess our disappointment on such occasions, as we never have met with a satisfactory arrangement. Nor can it be expected that we should succeed in this arduous attempt, so long as there is no accurate and established meaning attached to the very words, which it would be indispensably necessary to adopt, in order to distinguish the *physical* from the *metaphysical* sciences. The latter, indeed, are, at this *uncritical* period, in a manner exiled from the studies of the inquisitive; though they appear to be so closely cemented to the human mind, that they will constantly intrude on our attention, engage the faculties of speculation, and absorb the powers of reflection, even when in a manner proscribed.-- Conceiving, therefore, that it would be a fruitless innovation to introduce any new terms in the present state of philosophical nomenclature, we shall content ourselves with simply enumerating the heads of the different branches of the arts and sciences.

I. *Divinity*; comprehending Church History, Criticism, and Exegesis; Polemical and Dogmatical Essays; Theological Morality; Sermons and Homilies; Catechetical works; Liturgy and books on Devotion; Translations and Editions of the Bible.

II. *Jurisprudence* or *Law*: which may be divided into English, Scotch, and peculiar private Law; into Ecclesiastical, Political, and Criminal Law; theoretical and practical Jurisprudence; its literary History, &c.

III. *Medicine*; comprising Anatomy; Physiology; Pathology; Symptomatology, or the doctrine of Diagnostics; Therapeutics; Surgery; Midwifery; Pharmacy; the Veterinary Art; Medical Police and Jurisprudence; domestic or popular Medicine, &c.

IV. *Philosophy*: viz. Logic and Metaphysics, or Speculative Philosophy; Psychology, or the practical study of the human mind; Ethics or Moral Philosophy; Theory of Education; Law of Nature; and Political Economy.

V. *Mathematics*; comprizing Arithmetic; Geometry; Astronomy; Architecture; Fortification; and pure Mechanics.

VI. *Natural History*; ; including Meteorology; Geology; Hydrology; Mineralogy; Botany; and Zoology.

VII. *Universal History*; namely, Geography; Statistics; Diplomatic Transactions; Heraldry; Chronology; Genealogy; Numismatology, or the knowledge of Medals and Coins; Antiquities; Mythology; Archaeology; Biography, and Topography.

VIII. *Belles Lettres*, or Polite Literature.—See vol. i. p. 246.

IX. *Philology*: Grammars, Dictionaries, Editions and Translations of Greek and Roman Classics, as well as of Modern Languages, such as the French, Italian, Spanish, German, &c.—Study of the English language, which ought to *precede* all other pursuits; as, without a thorough knowledge of the native tongue (of which very few of our *modern scholars* can boast), it is impossible to make great progress in foreign languages, or to become intimate with any complicated art or science.

X. *Economical Sciences*, including all the Mechanical Arts and Manufactures; as well as Trade, Commerce, and Navigation; but principally Agriculture and Gardening; the Arts of rearing Cattle, cultivating Trees, and managing Bees; Hunting; Fishing; Cooking, &c.

XI. *Physics*; namely, Natural Philosophy, Chemistry, Mineralogy, &c.

XII. *Miscellaneous Literature*; for instance, Encyclopædias; scientific works on a variety of subjects; treatises on Freemasonry; Literary Quarrels; books with obscure titles; critical journals, monthly magazines, and newspapers.

Endive: See Succory.

Engine: See Fire.

ENGRAFTING, or Grafting, a term in gardening, which signifies the taking a shoot from one tree, and inserting it into another, so that they may closely unite, and form one trunk.

Grafting has been practised from the most remote antiquity; but its origin and invention are differently related by Naturalists. The great aim of this useful art is, to propagate any curious sorts of fruit-trees, to insure the growth of similar kinds, which cannot be effected by any other method: for, as all the good species of fruit have been accidentally obtained from seeds, many of these, when sown, will degenerate, and produce bad fruit. But, when shoots are taken from such trees as bear good fruit, they will never change their kind, whatever be their stock, or the tree on which they are grafted.

Mr. Bradley observes, that the stock grafted on, is only to be considered as a fund of vegetable matter, which is to be filtered through the cyon, digested, and brought to maturity, as the time of growth in the vessels of the cyon directs. A cyon, therefore, of one kind, grafted on a tree of another, may be rather said to take root in the tree it is grafted, than to unite with it: for it is obvious that the cyon preserves its natural purity, though it be fed and nourished by a mere crab.

The grafts or cyons with which this operation is effected, should be of the last summer's growth, from the outside branches; firm and well ripened; and selected from healthy trees. The graft is always the middle part of each shoot, cut to 5 or 6 inches in length, or so as to have 4 or 5 good eyes, or buds, but should be preserved at full length, till grafting time.

The proper tools and other materials used in grafting, are: 1. A strong knife for cutting off the heads of the stocks, previous to the insertion of the graft; also a small hand-saw, for occasional use, in cutting off the heads of large stocks; 2. A common grafting-knife, or strong sharp penknife, for cutting and shaping the grafts ready for insertion; also to slope and form the stocks for the reception of the cyons; 3. A flat grafting chisel, and small mallet for clefting large stocks, in cleft-grafting; 4. A quantity of new bass-strings for bandages, for securing the grafts, and promoting their speedy union with the stock; and 5. A quantity of clay, for applying closely round the grafts after their insertion and binding, to defend the parts from the influence of the sun, winds, and wet weather, or from being affected by cold.

For

For this purpose, a kind of stiff loamy mortar may be prepared of strong fat loam; or any other tough clay may be substituted; to which may be added a fourth part of fresh horse-dung, free from litter, and a small portion of cut hay, with a little water, well mixed: the whole should be properly beaten with a stick, and thus incorporated. This operation should be repeated, according to the nature of the clay, and performed several times during the first day; the composition being still moistened with water for six or seven days successively, at the end of which time it will be fit for use.

There are various other modes of engrafting, which are termed whip-grafting, or tongue-grafting, cleft-grafting, crown-grafting, root-grafting, cheek-grafting, side-grafting; and, lastly, grafting by approach, or INARCHING (to which we refer). Beside this last-mentioned, the following are most commonly and successfully practised:

1. *Whip-grafting*, or *tongue-grafting*, is generally performed in nurseries, upon small stocks, from a quarter of an inch to half, or a whole inch in diameter. The stock, and cyons or grafts, should always be of the same size, or approach as nearly to the same size as possible. They are both to be sloped off a full inch, or more, and then tied closely together. This method may be much improved, by performing what gardeners call *tongueing*, or *tipping*; that is, by making an incision in the bare part of the stock, downwards, and a similar slit in the cyon, upwards; after which they are to be carefully joined together, so that the rinds of both may meet in every part, when a ligament or bandage of bass is to be tied round the cyon, to prevent it from being displaced; and the whole is to be covered over, or coated, with the clay above described.

2. *Cleft-grafting*, or *slit-grafting*, as gardeners differently term it, is performed upon stocks from one to two inches in diameter. The head of the stock being carefully cut off, in a sloping direction, a perpendicular cleft, or slit, is to be made about two inches deep, with a knife or chisel, towards the back of the slope, into which a wedge is to be driven, in order to keep it open for the admission of the cyon: the latter must now be cut in a perpendicular direction, and in the form of a wedge, so as to fit the incision in the stock. As soon as it is prepared, it should be placed in the cleft, in such a manner that the inner bark of both the stock and cyon may meet exactly together. It is then to be tied with a ligature of bass, and clayed over, as is practised in whip-grafting, three or four eyes being left on the cyon uncovered. The proper season for this mode of grafting is the same as for the preceding, viz. the months of February and March: towards the latter end of May, or the beginning of June, the junction of the graft and stock will be completed, and the latter begin to shoot; when the clay may be taken off, and, in the course of a fortnight or three weeks, the bandages may be removed.

ENRICHING PLANTS, a term employed by gardeners to denote such plants as ameliorate land, in consequence of which the same soil will produce a good crop of corn; as, without attending to the culture of such plants, a very indifferent one would have followed. —See CROPS.

The necessity of sowing such

vegetables has, however, been in a great measure superseded by the general adoption of the drill, and horse-hoeing husbandry, by which all weeds are totally eradicated, and consequently they will not obstruct the growth of the corn or other grain that may be sown.—See DRILLING.

EPIDEMIC, in general, denotes a spreading disorder which, as is supposed, arises from some corruption or malignity in the air, and attacks great numbers of people at certain seasons.

Mankind have always been more inclined to search for the most distant causes, in order to explain physical events, rather than to avail themselves of those which are within their reach. Thus the yellow-fever, which in 1793 ravaged the city of Philadelphia, was doubtless generated by the immense quantities of damaged coffee, and other putrescible substances, exposed in the heat of summer on the muddy banks of the river. In like manner the plague, which formerly destroyed great numbers in London, was not always imported, but probably originated at home, where, in those ages, *cleanliness* was not so generally attended to as it is at present. Hence this domestic virtue has guarded us against many epidemics, to which other less cleanly nations have been subject. But there is still great occasion for improvements, especially in the houses of the narrow courts and alleys of the metropolis, where the progress of a contagious malignant fever has lately excited considerable alarm. The Society for bettering the Condition of the Poor (according to the printed Report of the philanthropic T. BERNARD, Esq.) have proposed another benevolent institution, to check the ravages of contagious distempers among that class of persons, who are most liable and exposed to their influence. Farther particulars relative to this interesting subject we propose to give under the head of INFECTION: See also CONTAGION.

EPILEPSY, or FALLING-SICKNESS, though hitherto considered an incurable disease, has often been relieved by the conjoint power of medicines and an appropriate diet. Hence, a pure and fresh air, light but nutritive food; chearful company, and moderate exercise, will be here of greater service than the most celebrated nostrums, which are daily imposed upon the credulous. On the other hand, epileptic patients should carefully avoid all strong and heating, as well as *hot* liquors, which equally relax the stomach; abstain from swine's flesh, very fat meat, game, water-fowl, salted or pickled provisions, and likewise from oily and watery vegetables: hence they ought not to eat nuts, nor cabbages, greens, &c.

In a disease of so formidable a nature as the epilepsy, no medicines can be taken with the least probability of success, without having previously ascertained the *cause*, which may be extremely various: for this obvious reason, medical advice cannot be dispensed with, unless it be superseded by the pretensions of quack medicines.

Among the numberless means and expedients contrived for the purpose of checking epileptic attacks, we shall only mention two: Dr. LYSONS, in his "*Practical Essays*," relates the case of a successful application of ligatures to the legs, on the first approach of the fits, which were always observed to commence their course from the lower extremities.—Dr. GYSSER, physician at Pforzheim, in Swabia, has lately discovered a remedy which, in its nature, is equally novel and extraordinary. But, as he positively asserts that the following singular expedient has, in many instances, procured effectual and almost immediate relief, we do not hesitate to communicate it to our readers. Dr. G. selects a young and healthy *pigeon*, the fundament of which he applies to that of the patient, so as to fit each other exactly. Soon after this junction, the bird is seized with convulsive motions, and a difficulty of breathing; in consequence of which, it either expires in a few minutes, or very slowly recovers from those dangerous symptoms.—Although this species of *vital clyster*, which, in Germany, has proved an infallible remedy, is not calculated to remove the cause of so alarming a disease, yet, as the application of it is neither attended with hazard nor trouble, there can be no reasonable objection to the experiment, however whimsical it may, at first, appear to those who consider the subject in a superficial manner.

EPSOM SALT, was formerly obtained by boiling down the mineral water found in the vicinity of Epsom. It is at present prepared from sea-water, which after being boiled down, deposits an uncrystallized brine, that consists chiefly of muriated magnesia, and is sold in the shops, under the name of *bitter purging salt*.—It is of considerable service in colics, scurvy, rheumatism, and other chronical complaints.

EPSOM WATER is that saline spring, which rises at the distance of about half a mile from the town of Epsom, in the county of Surrey. It is transparent, and colourless, at first almost insipid, but a short time after it has been drunk, it leaves a bitter, saline taste on the tongue. It does not suffer any material alteration by being exposed to the air; and, if closely corked in clean vessels, it may be preserved for several months in a fresh and potable state.

As this water contains only a small portion of the salt, namely, from one to two scruples, in the quantity of half a pint, the patient ought to drink from two to three pints successively, within a short space of time, in order to produce the full purgative effect. If taken in this dose, it will operate in a mild and efficacious manner, but if in a smaller, its action is determined to the kidnies.

Epsom water is of considerable service in a variety of disorders, namely, hypochondriasis, an impaired state of health accompanied with œdematous tumors in the extremities, and a depraved digestion; to which sedentary persons are peculiarly liable. Those who are afflicted with hemorrhoidal and scorbutic complaints, will be benefited by the liberal use of this saline water, which likewise affords considerable relief in obstructions of the viscera.

This mineral water is easily imitated, by dissolving half an ounce of Epsom salt in a quart of pure water, rendered somewhat acid, by the infusion a few drops of spirit of vitriol, and oil of tartar.

ERRHINES. See SNEEZING.

ERUPTION. See SKIN.

ERYNGO, or SEA-HOLLY, *Eryngium*, L. a genus of plants, consisting of eleven species, two of which are natives of this country, viz.

1. The *maritimum*, or Sea-eryngo, which is perennial, grows on the sea-shore, strikes its roots 20 feet deep into the soil, and flowers in the month of July or August.

2. The *campestre*, or Field-eryngo, which is also perennial, grows chiefly near the sea-side, and likewise flowers in the month of July or August.

Both species possess the same properties; the leaves being somewhat sweet, and having an aromatic warmth or pungency. The sea-eryngo, however, is much stronger than the latter species.—The young, flowering shoots, when boiled, have the flavour of asparagus, and are an wholesome and nutritious summer food. The roots of the first species are principally directed for medical use: they possess no remarkable smell; but, when chewed, have a pleasing, and somewhat aromatic sweetness. Boerhaave considered this plant as one of the principal aperients, and he usually prescribed it as a diuretic and antiscorbutic: at present, however, the roots only are candied, and preserved as sweetmeats: those of the second species are thick, pulpy, sweet and nourishing, on which account the Germans boil and eat them as a culinary vegetable.—See Hectic.

In dyeing, these plants afford but an indifferent yellowish brown colour: hence they are, according to M. Meyer, of Prague, more advantageously employed in that city for extracting *soda*, or mineral alkali.

Erysipelas. See Rose.

ESCHALLOT, or Shallot, *Allium Ascalonicum*, L. is a native of Palestine, whence it has been introduced into our kitchen gardens. It is raised from suckers, which are set about the end of February, in beds or furrows, at the distance of about three inches from each other. Towards the end of June, the stems are tied up; and, in the course of another month, the plants are pulled out of the earth; when they are exposed to the air to dry, and afterwards preserved in some dry airy place.

The roots of the eschallot are very pungent; have a strong but pleasing smell, and are preferred to onions, as ingredients in highly-flavoured soups and gravies. They are also pickled, in which state considerable quantities are consumed in the East Indies.

This plant, when mixed with vinegar, rice, and honey, is said to be serviceable against the bite of a mad dog; we doubt, however, the efficacy and propriety of such an application. It is also recommended as an excellent cephalic, especially when inhaled through the nostrils; but its most beneficial properties are those of creating an appetite, and expelling foul air.

ESPALIERS, in horticulture, are rows of trees, planted in gardens or hedges, in such a manner as to inclose distinct lots of ground; hence they are trained up regularly to a lattice of wood-work, in a close hedge, for defending tender plants against the injuries of the wind and weather.

The trees chiefly planted for espaliers, are apples, pears, and plums. While they are young, it will be sufficient to drive a few stakes into the ground on both sides; the branches being fastened to them in an horizontal direction, as soon as they appear. At the expiration of three years, an espalier is to be made of ash-poles, of which two sizes, large and small ones, should be employed; the former are to be driven upright into the ground, about a foot distant; the latter, or smaller poles, are to be nailed across these, at the distance of nine inches.

There is another kind of espaliers, made of square pieces of timber cut to any size; and which are certainly more handsome and regular, but on account of the extravagant price of wood, less economical than those constructed with ash-poles.

As soon as the espalier is thus framed, the branches are to be affixed to it by means of ozier-twigs; being trained in an horizontal direction, and at equal distances. Fruit-trees managed in this manner, are preferable to all others, because they not only bear more delicious fruit, but also require less room in a garden; and consequently do not retard the growth of such plants as may be cultivated in their vicinity.

ESSENCE, or Essential Oil, as it is variously termed, in medicine, denotes the purest, most subtle, and balsamic part of a body, extracted by distillation.

There are a variety of essences drawn from flowers, fruits, &c. which are used on account of their agreeable flavour by apothecaries, perfumers, and others: the principal of these are the essence of rosemary, of turpentine, of anise, of cloves, of cinnamon, and of lemons.

The essences sold by perfumers, chiefly consist of the oil of bitter-almonds, to which they impart the odour of jassamine, roses, cinnamon, and other flowers and spices. When essential oils have been distilled, they should be suffered to subside for some days, in vessels loosely covered with paper, till they have lost their disagreeable, ardent odour, and have become limpid; they should be put into small bottles, which ought to be completely filled, closely stopped, and kept in a cool place: by observing these precautions, they will retain their virtue for several years. But, if essential oils be carelessly managed, they gradually lose their flavour, and become thick: in this case, they should be put into a still, with fresh ingredients for distilling the same oil; by which means they will saturate themselves with the odoriferous particles, and regain their former strength and purity.

Essential oils, medicinally considered, agree in the general qualities of pungency and heat: with respect to their particular virtues, they vary as much as the vegetables from which they are extracted. Thus, the carminative properties of aromatic seeds, the diuretic effects of juniper-berries, the stomachic virtues of mint, and the antiscorbutic powers of scurvy-grass, are in a great measure concentrated in their oils.

These oils are never given in a pure state, on account of their extreme pungency, which in some is so great, that if a single drop be deposited on the tongue, it will occasion a gangrenous eschar, or scab. They are readily imbibed by pure, dry sugar, being the most convenient form in which they can be administered. The more mild and grateful oils are frequently used as ingredients with other medicines, to render them less nauseous. The more pungent ones are externally employed in paralytic complaints, numbness, colds, aches, and in other cases, where particular parts require to be heated or stimulated.

ETHER, or dulcified spirit of vitriol, is a very subtle penetrating fluid, prepared by distilling equal proportions of rectified spirit of wine, and vitriolic acid.

This spirit is the lightest, most volatile, and most inflammable yet known; it floats on the surface of the most highly rectified spirit of wine, as oil floats on water: and, if it be dropped on a warm hand, it exhales immediately, diffusing a penetrating fragrance, and leaving no trace of any moisture.

Ether is often successfully employed in medicine. It sometimes affords immediate relief in violent head-achs, by being externally applied to the painful part; and suppresses the tooth-ach, when laid on the affected jaw. It has also been given internally, with considerable success, in hooping-coughs; in hysterical cases; in asthmas; and, indeed, in almost every spasmodic affection, from a few drops, to the quantity of half an ounce, taken in a glass of cold water, which should be expeditiously swallowed, to prevent the exhalation of this volatile liquor.

There is another preparation of a similar nature, but more powerful in its effects, called *naphtha aceti*, or acetous ether, which is seldom kept in the shops of this country. Its flavour is more pleasant than that of the former, being prepared by mixing 6 ounces of concentrated vitriolic acid with 10 ounces of rectified spirit of wine, and pouring this mixture gradually on 16 ounces of regenerated tartar, in a glass retort; and then drawing off about ten ounces, over a very moderate fire. This affords an excellent, but expensive, remedy in all the cases where the vitriolic ether is generally used.

EUPHORBIUM, a gummy-resinous substance, which exudes from a tree of the same name, growing in Africa; whence it is imported in drops of an irregular form. These are externally of a pale yellowish colour; but, when broken, appear to be white internally. If applied to the tongue, they affect it with a very pungent taste; and, if held for some time in the mouth, they become exceedingly acrimonious, inflaming and exulcerating the jaws to a violent degree. Hence this substance is unfit for internal use, though it is sometimes employed as a sternutatory.—See HELLEBORE.

Externally, this gum is the principal ingredient in various resolvent plasters, and has been found serviceable in cleansing foul ulcers, and also in exfoliating carious or rotten bones. At present, it is employed chiefly by farriers, for curing the *farcin*, or the scab in horses. Formerly, the tincture of euphorbium, mixed with the oil of myrrh, was much used for discussing scrophulous tumors, as well as for effacing spots and smoothening inequalities of the skin, proceeding from the small-pox.

EVACUATION, in animal economy, is the act of diminishing, attenuating, or discharging the humours.

The due evacuations of the body, and its proper nourishment, are equally necessary; and it is an object of the utmost importance, that nothing remain in the constitution which should be discharged; and that whatever is conducive to its preservation, may not be uselessly wasted. If the evacuations be disordered, the most rigid adherence to dietetic rules will not contribute to the continuance, or restoration of health; these rules, however, may often be dispensed with, provided the evacuations be regular.

It is not only the noxious, or corrupt matter, which is removed by this process, but also the useful fluids, if they abound, such as the milk, blood, &c. to which subjects we refer, and likewise to the articles EAR, NOSE, URINE, &c.

EVAPORATION, is the conversion of fluids, chiefly of water, into vapour which is specifically lighter than the atmosphere.

There is no subject that has occasioned a greater variety of opinions than the theory of evaporation; but, consistently with our plan, we shall recite only a few established facts.

Evaporation is one of the great chemical processes by means of which Nature supplies the whole vegetable kingdom with the dew and rain necessary for its support. Hence, it takes place at all times, not only from the surface of the ocean, but also from that of the earth. Nor is it confined to these: it is even carried on from the leaves of trees, grass, &c. with which the earth is covered. Great part of the water which is thus raised, descends again during the night, in the form of dew, being absorbed by those vegetables which yielded it before.

One of the most beneficial effects of evaporation is, to cool the earth, and prevent it from being too much heated by the sun. This property of producing cold, by evaporation, has but lately been observed by chemists, who have accordingly availed themselves of it in its fullest extent; though their mode of procuring cold, by means of those expensive fluids, ether and spirit of wine, can only be employed by way of experiment. The most simple method, however, of producing cold by the evaporation of water, may be applied to various useful purposes, especially in warm countries: thus sailors are accustomed to cool their casks of liquors, by sprinkling them with sea-water.—See also ICE.

Dr. DARWIN justly observes, that the evaporation of moisture from the surface of the earth, produces so much cold as to injure those terrestrial plants which are too long covered with it. Hence such parts of wall-trees as are sheltered from the descending dews, by a coping stone on the wall, are not so liable to be injured by frosty nights; because they are not made colder by the evaporation of the dew, and also have less water to be congealed in their vessels, and to burst them by its consequent expansion.

EVENING, is that part of the night which commences with sunset, and properly terminates when the prudent and industrious repair to their couch—long before midnight.

In countries surrounded by the ocean, the evenings are generally damp and chilly, so that the temperature of the air is many degrees colder than in the preceding day. Hence the necessity of adopting a warmer dress than usually worn, if we are obliged to expose ourselves to the evening-air: invalids and convalescents ought not to leave their apartments after sunset,

set, even though the sky be ever so serene, and the weather uncommonly mild.

Nor is it proper for the healthy to pursue those occupations in the evening, which are attended with proportionally greater fatigue of mind or body: such pursuits ought to be followed in the morning, and the easiest purposely deferred to the latter part of the day; an arrangement by which a more composed and refreshing night's rest will be ensured. Beside this inconvenience, the eyes necessarily suffer from candle-light.—See also Bed-time.

EVERGREENS, in gardening, are those perennial plants which continue their verdure, leaves, &c. throughout the year, such as bays, hollies, pines, firs, cedars of Lebanon, &c.

In the evergreen shrubs and trees of this climate, such as heath, rue, box, laurel, &c. the leaf does not die in the autumn, but continues to supply nourishment to the bud in its bosom during the fine days of winter, and in the spring, and survives till near Midsummer, or till the new bud has expanded a leaf of its own. Hence Dr. Darwin supposes, that these evergreens lay up in summer no store of nutriment in their roots, or alburnum, for the sustenance of their ensuing vernal buds; and thus have probably no bleeding season, like deciduous trees.

Mr. Milne, in his *Botanical Dictionary*, under the article *Defoliatio*, observes, that "an evergreen tree, grafted on a deciduous one, determines the latter to retain its leaves. This observation is confirmed by repeated experiments, particularly by grafting the laurel *(Laurocerasus)* an evergreen, on the common cherry *(Cerasus)*; or the *Ilex*, an ever-green oak, on the common oak."—All these, adds Dr. Darwin, want farther experiments, to authenticate the facts so delivered on the authority of ingenious men.

Evergreens are not only very great ornaments to a garden, at all seasons, but they also contribute to the purity of the air, when planted at a proper distance from dwelling-houses. Although their verdure, especially that of the pine and fir-trees, when scattered in rooms, exhales a narcotic and intoxicating effluvium, not unlike that of hops, yet the boughs of all evergreens may be usefully employed, particularly in winter, for correcting the stagnant air in a room: with this intention the branches are plunged with their root-ends into vessels filled with fresh water, and exposed to the rays of the sun; but not suffered to remain in the apartment during the night, or in the shade.

Everlasting. See Cudweed.

Ewe. See Sheep.

Excess. See Drunkenness.

EXCHANGE, in commerce, implies the receiving or paying of money in one country for a similar sum in another, by means of bills of exchange.—See Bill.

The laws of all commercial nations have conferred great privileges on bills of exchange; punctuality in liquidating them, is essential to commerce: as soon, therefore, as a merchant's accepted bill is protested, on account of his insolvency, he is considered a bankrupt.

A regular bill of this description is a mercantile contract, in which four persons are concerned, viz. 1. The drawer, who receives the value. 2. The drawee, his debtor, in a distant place, upon whom the bill

bill is drawn, and who must accept and pay it. 3. The person who gives a valuable consideration for the bill, and to whom, or to whose order it is to be paid: and 4. The person to whom payment is to be made, and who is creditor to the third. By this operation, reciprocal debts, which are due in two distant places, are paid by a kind of transfer, or permutation of debtors and creditors.

Beside those merchants, who circulate among themselves their reciprocal debts and credits, arising from their importation and exportation of goods, there is another class of men who deal in exchange; that is, in the importation and exportation of money and bills. When, however, balances are to be made, exchange becomes intricate; and merchants, being engaged in their particular branches of trade, commonly intrust these complicated calculations to certain agents, who are thence called *exchange-brokers*, and have made this a most lucrative employment.

The Course of Exchange, is the current price between two places, which is always fluctuating and unsettled, being sometimes above, and at others below par, according to the circumstances of trade. When the course of exchange rises above par, the balance of trade is said to run against that country where it rises. But, though the course of exchange be in a perpetual fluctuation, and rise or fall, according to various circumstances, yet the exchanges of London, Hamburgh, Amsterdam, and Venice, regulate those of all the other trading places of Europe.—Such readers as are desirous to make themselves acquainted with the laws of this country, as they relate to cash bills, and bills of exchange, will find ample information in Mr. CHITTY's "*Treatise on Bills of Exchange*," &c. (8vo. 7s.), where the subject is perspicuously and accurately treated.

EXCORIATION, or fretting of the skin, is a complaint sometimes arising from want of due attention to infants, or in persons unaccustomed to ride on horseback, or those who are unfortunately bed-ridden.

If the excoriation be only of a superficial kind, the application of a little hot flour, or covering the part affected with fine silken oil-cloth, will generally heal it in a fews days: but, if these simple means do not succeed, an ointment consisting of one ounce of the finest mutton-suet, and a dozen drops of the common oil of turpentine, gradually added while the former is melting, has generally been found of service.

In those cases, however, where the true skin is affected, so that the excoriation is attended with considerable pain, it will be useful immediately to apply the plant called self-heal *(prunella vulgaris)*, finely pounded in a marble mortar, with the addition of a few grains of alum. Thus, the inflammation of the contiguous parts may be prevented; but, if this have already taken place, it should be previously reduced by a timely application of emollient POULTICES, to which we refer.

EXCRESCENCE. See WART.

EXCRETION, in animal economy, is the discharge of foul or noxious humours, by stool.

As the food and drink daily consumed must necessarily deposit feculent and useless matter, moderate evacuations by stool, are both necessary and beneficial, especially to those who are troubled with costiveness, head-achs, flatulency, spasms, and the numberless unpleasant disorders thence arising.—See Costiveness.

Persons in a good state of health ought to have one evacuation at least, and sometimes two, in the course of twenty-four hours.—Moderate exercise and a tranquil mind, equally tend to promote these salutary excretions, which should be in a state neither too fluid, nor too concrete. Hard and continued labour, ardent spirits, or heating liquors, as well as long abstinence, render them extremely tenacious in the strongest and most healthy individuals. When such a habit prevails, it at length generates costiveness, with all its attendant evils.

Those who indulge either in excessive eating or drinking, are generally troubled with loose and frequent stools; because their alimentary matter is expelled, without being properly assimilated. Indeed, thin and copious discharges are a certain evidence of indigestion.

Regular and daily evacuations, therefore, essentially contribute to the preservation of health. This desirable object may be attained, by taking sufficient, but moderate, exercise; by adapting the food to the nature of the constitution, and using a proportionate quantity of drink; by observing strict temperance in both; and lastly, by not indulging in too much sleep, which is in a peculiar degree hurtful after dinner, to those whose digestive powers are impaired, and whose evacuations are uncommonly languid.—By attending to these few practical suggestions, a due excretion of the noxious and superabundant fluids will be promoted, and the greatest of blessings, health, consequently ensured.

EXERCISE, in general, is such an agitation of the body, as produces salutary effects in the animal economy.

Exercise may be divided into two classes, *active* and *passive*: the former includes walking, hunting, dancing, running, leaping, swimming, riding on horseback, fencing, the military exercise, and, in short, all such games as require muscular exertions. Passive exercise comprehends riding in a coach, sailing, swinging, &c.; all which we shall notice in their alphabetical order.

Exercise in the open air is, in every respect, preferable to that in houses, and close apartments. It ought, however, to be commenced and concluded in a gradual manner, and by no means abruptly. It should be continued only while we enjoy it without fatigue, and ought to be relinquished as soon as it becomes a task. The best time for this purpose is the forenoon, or some time before dinner, when the stomach is not too much distended: thus it increases the circulation of the blood; attenuates and divides the fluids; and promotes a regular perspiration, as well as a due secretion of all the humours. It likewise raises the animal spirits, strengthens the muscular parts, creates appetite, and aids digestion. Hence those who take proper daily exercise, are in general robust, and afflicted with few diseases.

On the other hand, violent exercise, or even fast walking, immediately before or after meals, is extremely pernicious; for it impedes digestion, and impels to the surface of the body those fluids which are intended to promote the solution of aliment.—Immoderate exercise weakens the body, destroys the elasticity of the fibres, and necessarily accelerates both respiration, and the circulation of the blood; which may cause a variety of accidents, namely, the bursting of small blood-vessels, inflammations, and collections of blood towards certain parts of the body, such as the heart and brain. The saline acrimony of the fluids being thus more disengaged, the fat liquefies; and ardent fevers, palsies, &c. are the melancholy consequences.

Of still greater importance is the exercise of children; for, on its proper regulation, their future health and straitness, in a great measure, depend. This subject having very lately been perspicuously treated by Dr. STRUVE, we shall subjoin only a few elementary principles from his work on Physical Education: 1. Children ought to enjoy perfect liberty to move, leap, and take exercise at pleasure. 2. They should not be taught to rely on the assistance of others; but endeavour to make every effort consistent with their own strength. 3. When in the act of falling, they ought not to be seized by the arm; and, after a fall, should not be too much pitied. 4. Every kind of *spontaneous* exercise is preferable to that taken by *compulsion*. 5. Exercise, though at an early period of infancy, must be *uniform*, that is, not confined to particular limbs of the body, nor at any time carried to excess.—We sincerely recommend these rules to the serious consideration of those who are engaged in the arduous and important task of rearing children; as we are fully persuaded that, by a timely attention to those circumstances, many accidents, and much deformity, may be effectually prevented.

EXHALATION, generally speaking, denotes effluvia or steams which arise from the surface of the earth, or other bodies, in the form of vapour.

Plants and flowers afford a grateful exhalation, provided their fragrance be not too strong: hence they should never be placed in confined apartments, as instances have occurred of persons being almost suffocated, by sleeping in rooms where quantities of fresh flowers were exposed. In serene weather, however, fresh plants or ever-greens (but by no means flowers) may be strewed with advantage, during the day, in the apartments of valetudinarians; as such vegetables, especially in sunshine, generate a vital air, which produces salutary effects on the lungs.

The exhalations arising from vast numbers of burning candles, as also from the breath of many persons respiring in the same room, are peculiarly unwholesome to weak and consumptive habits. This inconvenience may, however, be remedied by means of conical tubes, the funnels or broad ends of which should be placed so as to communicate in or above the windows, with the open air: thus, the latter will be impelled into the rooms with considerable force, and ventilate them more effectually, and at much less expence than is accomplished by fumigations, or other methods.

The vapour arising from charcoal is particularly hurtful; and, in close apartments, often productive of fatal accidents: the greatest precaution is therefore requisite, when chorcoal is employed for culinary or domestic purposes. In a similar manner, *humid air* of every kind is very detrimental to health; and we seriously reprobate the keeping of damp linen, wet clothes, and even wet umbrellas in dwelling-rooms; as, by paying due attention to this circumstance, many serious accidents might easily be prevented.

EXOTIC, an appellation given to plants, which are not natives of Britain.

The generality of exotic plants do not thrive in this country, without particular care and culture; they require the warmth of their own climates; hence hot-beds, green-houses, &c. become necessary.—See GREEN-HOUSE, and STOVE.

The best method of packing exotic plants for a voyage, especially if they be such as will perish above ground, is to set their roots as closely as possible in wooden boxes, filled with proper soil, and provided with handles: this operation may be performed three weeks before they are shipped. During fair weather, they should be exposed upon the deck, but in wet or unfavourable seasons, they ought to be removed, or covered with a tarpawlin.

If exotics are conveyed to a colder climate, they require very little moisture; but, if they are sent from a cold to a warmer country, it will be necessary to water them liberally; and, if they be sheltered from the scorching rays of the sun, they will safely arrive at the place of their destination.

There are, however, several plants that will live for a considerable time without earth, such as the ESCHALLOT (to which we refer), and other *succulent* exotics. These vegetables require only to be carefully packed in boxes, with some moss: a little hay should likewise be added, to prevent the different roots from rubbing against, or bruising each other; the boxes should also be perforated with holes, an expedient by which the plants will be preserved from heating, and consequent putrefaction. With these precautions, they will not be materially injured by a voyage of two or three, or even four or five months. Several trees will likewise arrive in safety, if packed up in this manner, *after* they have ceased to grow; such as oranges, olives, capers, and pomegranate-trees, of which great numbers are annually imported from Italy; and, though they are generally three or four months in their passage, yet they seldom receive any damage.

EXPECTORANTS, are such medicines as promote expectoration, that is, the discharge of mucus, or other matters from the breast, lungs, and wind-pipe, by coughing, bringing up phlegm, &c.

Expectorants operate in different ways; for, if the humour secreted, be acrid and thin, and the pores of the glands be too much constricted, these medicines generally relax, soften, and widen the passages; diminish the acrimony of the animal fluids; and coagulate those parts which are too thin and watery: for which purpose, the liquorice-root, honey, spermaceti, saffron, mallows, and oil of almonds, are very frequently used. But, if a considerable quantity of thick, viscid matter be lodged in the lungs, so as to obstruct breathing, it will be necessary to aid expectoration by means of such substances as may dissolve the tough and glutinous humour. This object may be effected by taking decoctions of the Greater Celandine, Scabious, Elecampane, and other pectoral herbs.—See also COUGH, and CATARRH.

Great caution, however, is necessary in administering expectorants of whatever kind. Hence we cannot but censure the injudicious practice of those mothers and nurses, who often load the tender stomachs of infants with a variety of preparations, both of sweet and oily substances, with the view of relieving coughs; but, as children have not sufficient strength to promote the evacuation of matter from the vessels of the breast, such potions, far from being of any real service, must necessarily occasion no small injury. Indeed, this practice is the more dangerous, as the cough, and consequent stricture of the chest, may arise from a variety of causes, too numerous to be here recited.

EXTRACTS, are those medicinal preparations obtained by boiling vegetable substances in water, and evaporating the strained decoction in broad, shallow vessels, to a thick consistence. Thus the most active parts of the plants are separated from the useless insoluble earthy matter.

As extraction is a chemical process, generally performed by the apothecary, we shall only observe, that the following extracts are directed to be kept in the shops by the London College: viz. extract of broom-tops; of cascarilla; of chamomile; of Peruvian bark with, and without, its resin; of colocynth compounded with aloes, scammony, &c.; of gentian; of liquorice; of black hellebore; of jalap; of log-wood; of white poppy; of rue; of savin; of senna; of wild cucumbers, &c.

EXTRAVASATION arises from the bursting or breaking of one or more of the blood vessels, after contusions, fractures, and other injuries of the head, as well as other parts of the body: this accident is attended with such a copious discharge of blood, as frequently occasions the most violent pain, and death itself, unless the patient be timely relieved.

As soon as the seat of the injury is discovered, the extravasated blood should first be discharged; after which the wound is to be cleaned, and all splinters or foreign bodies extracted. The assistance of a surgeon is, on this occasion, immediately required, because a vein must be opened, and as much blood taken away as the patient's strength will permit; by which the extravasation of more blood is prevented. A brisk laxative is next to be given, to lessen the quantity of the fluids; the head is to be fomented with medicated bags; and a plaster of melilot applied to it; while volatile salts, or spirit of hartshorn, may be held to the patient's nostrils; and decoctions of betony, lavender-flowers, or other attenuating liquids are administered, in order to support his strength. These applications will not, probably, be effectual at first; but they should be continued, especially if the more alarming symptoms appear to abate. And, if the patient seem to have received benefit from the bleeding, it will be proper to repeat it a second, or even a third time, particularly if he be of a robust and plethoric constitution. Meanwhile, no animal food, nor any stimulating

ing liquors should be used, and every degree of mental and bodily irritation should be carefully avoided.

EYE, the organ of sight, by means of which visible objects are represented to the mind.

It would be deviating from our plan, to give a minute anatomical description of this most useful organ; we shall, therefore, confine our attention to the necessary treatment of the eye, in a diseased as well as healthy state; in order to ensure a sound sight, to the latest period of life.

The eye is extremely tender, and liable to a variety of diseases, the most common of which are the following:

1. The eye-lids are sometimes infested with tumors of different kinds, and more particularly the *stye*, which grows on the edge of the eye-lid; is attended with heat, stiffness, pain; and, unless proper means be taken, with suppuration. It is a kind of abscess, which, in general, may be removed by discutient applications; but, should these prove ineffectual, a small emollient poultice ought to be applied, to induce a suppuration, after which the tumor will spontaneously heal. In case, however, it should not have the desired effect, a surgeon must open the stye with the point of a lancet; when the matter will be discharged.

2. Warts, and other tumors, which require the same treatment as when they arise on other parts of the body. But if, in extirpating such excrescences, part of the eye-lid should be corroded, the lips of the sore must be laid as nearly together as possible, and the matter hardening on it, frequently removed, without the application of any dressings: for these, however mild, will only irritate and inflame the ball of the eye.

3. The eye-lashes are, in some cases, so much inverted as to rub upon the eye, and thus produce pain and inflammation. This complaint arises from a variety of causes, without a complete knowledge of which it would be dangerous to attempt any application. Persons afflicted with this, or any other disease in the eye, ought without loss of time, to avail themselves of professional advice, or to consult an experienced oculist, who is able to ascertain the true source from which the disorder proceeds.

4. A protrusion of the eye, if it amount to a considerable degree, is attended with much deformity and uneasiness, arising not only from a large portion of the lining of the eye-lid being turned outwards, but also from too great an exposure of the pupil. If this defect proceed from an enlargement of the eye-ball, or in consequence of a dropsical swelling, the affection of the whole system must be attended to, without applying any local remedies; but, if it originate from the cicatrix of an old wound, or an abscess, it may be relieved by carefully dividing the skin, and taking the utmost precaution to guard against the effects of inflammation: such operations, however, should be performed only by skilful hands. —Lastly, if it be originally produced by the small-pox, scrophula, &c. or arise from old age, the eyes should be bathed daily with cold water, or with some astringent, and saturnine solution.

5. Specks are sometimes formed upon the white part of the eye, but more frequently upon the *cornea*, or the transparent horny coat, which

covers the sight. In the former case, they are seldom attended with much inconvenience; but, in the latter, they frequently cause either a partial or total blindness. Such specks are generally consequent to inflammation; and, if vision be materially impaired, it will be requisite to resort immediately to surgical assistance.

6. A membranous excrescence, called *pterygium*, frequently appears upon the white part of the eye, and often spreads over the cornea, in such a manner as entirely to destroy vision. It is either occasioned by external injuries, or arises from a general disease of the whole system, as in the scrophula, or scurvy, &c.; but inflammation is always the immediate cause. In this, as in the preceding complaint, the patient should not tamper with the delicate organ of sight; as, by *one* injudicious application, that sense may be lost, beyond the possibility of recovery.

7. The eye is sometimes enlarged by an accumulation of the aqueous humour; which occasions a sensation of fulness in the eye-ball, gradually impedes the motions of the eye-lids, renders vision progressively more imperfect, till the unfortunate patient can at length only discriminate light from darkness. As the disorder increases, the ball of the eye becomes greatly enlarged, and the cornea begins to protrude; so that, if a puncture be not made, the eye will burst, and discharge itself. In the early stages of this disease, the sight may perhaps be preserved by proper treatment; but we earnestly exhort all patients, if they feel the value of their eyes, to avoid those pernicious nostrums, vended under the name of collyria, eye-waters, &c.

8. Inflammation of the eye. See INFLAMMATION.

9. Blindness. See vol. i. p. 285.

10. Blood-shot eyes. See vol. i. p. 292.

11. Cataract. See GUTTA SERENA.

12. Short sight, though it cannot be strictly considered as a disorder of the eye, is nevertheless a serious evil. Those who are naturally near-sighted, are seldom relieved from that defect, till they attain a certain age, when that uncommon rotundity which occasions it, gradually decreases. In order to remedy this inconvenience, they have recourse to *eye-glasses*; which, on certain occasions, are of real utility; but instead of using both eyes at the same time, or at least alternately, they absurdly close one, while they view an object through the glass with the other; by which means they can only inspect it sideways; a practice that deserves severe censure, inasmuch as the eye which is not exercised, must necessarily become useless.—See SPECTACLES.

These remarks are equally applicable to those persons who can distinguish objects only at a distance; for eye-glasses to them also become necessary, to enable them to behold more minute objects with greater precision.

Weak eyes are chiefly occasioned by residing in confined situations: hence so many persons, living in towns, complain of this misfortune, which can only be attributed to the want of a pure atmosphere, as well as to the confined circle of vision:—the rays of light being reflected from smooth walls, which dazzle the eyes, cannot fail to injure those organs in a very material degree.

Those parents, consequently, who have a just regard for the health of their children, cannot testify it more effectually, than by exposing them daily and frequently to the bracing influence of the fresh air; and, if it become necessary to confine them in nurseries, instead of selecting the smallest and lowest apartment, the loftiest and most airy should be appropriated to that purpose. For a similar reason, infants ought to spend a considerable part of their time near the window, where distant objects may attract their attention; a practice which is highly conducive to the improvement of sight.

Those adults who are afflicted with weak eyes, should always burn two candles, placed in such a direction that their flame be neither too high nor too low; or rather make use of proper lamps: See vol. i. p. 432; and also, the article Lamps.—Persons of this description should never approach strong fires, nor live in hot rooms; for heat dissipates the natural moisture still remaining in debilitated eyes, so that it materially tends to weaken that organ, and at length induces total blindness. Rest, after long exertions, is very necessary and useful to the eyes, but the lids should never be too closely shut, as a continuance of that practice is very pernicious. Similar effects arise from a rude and frequent friction of these tender parts.

Few remedies for preserving the eyes are more refreshing and invigorating, than cautiously bathing them in cold water, three or four times in the day; the eye not being abruptly immersed, and the washing expeditiously managed. The drying of the eyes should likewise be carefully performed, lest that organ be too much stimulated, and at length inflamed.

Eyes of Horses.—These are liable to a variety of diseases, which proceed either from a defluxion or rheum, or from some external injury.

If a defluxion be the cause of the malady, it will previously be necessary to ascertain, whether it arises from the eye itself, or from some other injured part, as, in the latter case, the healing of that part will generally cure the eye. In the former, it will be requisite to administer remedies which cool the animal's blood: with this intention, two ounces of Glauber's salts, and two drams of nitre, may be mixed, and given every day with his bran; but if he should loathe his food, an equal quantity of the liver of antimony may be substituted, till his appetite returns.

When the eye has received external injury, the following application is recommended: Take of hog's lard; the oil of roses; and of elder, equal parts; and as soon as those ingredients are incorporated over the fire, anoint the eye affected, which will soon recover its former energy.—Some horses have naturally *weeping* eyes, which emit a sharp, acrid humour. These, however, may be easily cured, by washing or bathing them every day with brandy.

Eye-water *for Horses*.—Mr. Bradley recommends the following preparation, as being of singular efficacy in curing rheums in the eyes of this noble animal: Take four ounces of alehoof, or ground-ivy (not the creeping ivy), beat it in a marble mortar with the whites of six hard eggs, and add half a pint of clear white wine; a quarter of a pint of rose-water; sugar-candy and white vitriol, of each one ounce and an half;—beat them together with a pestle, that they may be properly incorporated; then strew over them one ounce of pure salt; cover the mortar; place it in a cellar; and, after it has stood there five or six hours, pour the whole into a clean bag of white serge, placing a vessel underneath to receive the liquor; which must be afterwards preserved in a glass bottle. A little of this preparation is to be poured, every morning and evening, into the horse's eye.

EYE-BRIGHT, or *Euphrasia officinalis*, L. an annual indigenous plant, growing on heaths, dry barren meadows, and in pastures: it flowers from July to September.

This vegetable is remarkable for not thriving in any situation, unless it be surrounded by plants that are taller than itself. It is eaten by cows, goats, horses, and sheep, but is refused by hogs.

Eye-bright is somewhat astringent and better; it imparts a black colour to a solution of vitriolated iron. Its reputed efficacy in curing various disorders of the eyes, appears to us doubtful: several authors, however, strongly praise its virtues, and maintain that it is particularly useful to eyes impaired by long-continued application, and also to those which are dim and watery, in consequence of old age. For this purpose, Mr. BRADLEY advises the powder of the dried leaves to be frequently taken internally, after mixing it with the yolk of an egg, and likewise to make daily use of this herb among culinary vegetables, or to apply a decoction of it in simple water externally.—In common with many other plants, the eye-bright has also been recommended in the jaundice. We confess our inexperience of its salutary effects.

F.

FACE, generally signifies the visage of any animal: it is more particularly applied to the human countenance; being the only conspicuous part of the body.

The human face is called the image of the soul, because it is the seat of the principal organs of sense, and the place where the ideas and emotions of the mind are most obviously displayed. It has always been considered the most comely and expressive part of the frame, so that various lotions, powders, &c. have been invented for beautifying and restoring ugly or decayed countenances. Such practice, however, though sanctioned by the folly and caprice of fashion, cannot be too severely censured. Having already pointed out this absurdity, and mentioned such preparations as *may* be safely used by those who are determined to employ them, we refer the reader to the head COSMETICS.—See also RING-WORM and SKIN.

FAGGOT, a bundle of pieces of wood, tied together for fuel, or other purposes.

In making up faggots, the workmen trim or cut off the superfluous branches, from the sides and end, which they insert in the middle of the bundle, where they can be of little service. Instead of continuing this wasteful method, such superfluous leaves and boughs ought to be scattered on the ground, which will, in consequence, be considerably ameliorated; for this kind of manure is particularly beneficial to bad and exhausted land, which may thus be converted into an excellent garden mould; and the growth of young trees will be remarkably promoted.

FAINTING. See SWOONING.

FAIR, a public place, where merchants, traders, and other persons, from remote parts, assemble on some fixed day in the year, to buy and sell commodities, and to partake of the diversions usually to be met with on such occasions.—See MARKET.

Fairs are of very ancient origin, and, though in former times, when the commercial intercourse of distant towns and countries was more difficult than it is at present, such establishments were useful, and perhaps necessary; yet, we are of opinion, that their *gradual* abolition would be attended with real benefit to the community.—Many scenes of idleness and profligacy might thus be obviated, and an additional number of valuable house and shopkeepers might be maintained in country towns and villages, in order to furnish the necessary commodities—instead of those unsettled dealers who spend one half of their time in travelling from fair to fair, and thus consume the profits of their trades, without materially contributing to support the burthens of society.

FALCON, a formidable bird of prey, of which there are two species, namely:

1. The JER-FALCON, *Falco Gyrfalco*, L. which is but seldom found in Scotland and the Orkneys: next to the eagle, it is the most intrepid and voracious of the feathered tribe, and likewise the most valuable species for the purposes of falconry. The stork, the heron, and the crane, fall easy victims to its bold attacks; and it kills hares, by darting upon them in a direct line.—It is remarkable that in this, as in all other birds of prey, the females are much larger and stronger than the males, which last are employed in falconry to catch only the smaller birds, such as the crow, the heron, and the kite.

2. The GENTIL-FALCON, which is less ferocious, and also rarely met with in Britain.

FALL, or the act of tumbling from an erect posture, or from a higher place, is sometimes attended with serious consequences; especially if it should be neglected in the beginning. Hence the necessity of examining the whole body, whether the fall has been productive of violent bruises, dislocations, or fractures; in which cases surgical aid should be immediately procured. But, if the person fallen, remain motionless, and in a swooning state; or in order to prevent him from fainting, it may be useful to administer a wine-glassful of sweet oil of olives, which will greatly tend to calm and compose the whole body.

After a fall from a precipice, or high place, it will perhaps be necessary to open a vein; but we cannot approve of that superstitious remedy, on this occasion, advised by the late Prof. BRADLEY; according to whom, the blood issuing from the comb of a large cock, and gradually drunk, after every clipping with a pair of scissars, gives so much vigour and strength to the wounded, as to enable him to be dressed.

FALLING-SICKNESS. See EPILEPSY.

FALLOWING, in agriculture, is the mode of preparing land, by ploughing it a considerable time before it is ploughed for seed.

Lands are laid fallow either during the summer, or during the winter, according to the nature of the soil, and the judgment of the cultivator. It is not our intention to enter into the dispute relative to the necessity or inutility of summer fallows; as very able arguments have been alledged as well for, as against it, by skilful agriculturists. Both summer and winter fallows, however, are occasionally useful on different soils.

The advantages to be derived from fallowing are: 1. By repeatedly turning soils over, much carbonic acid, or fixed air, is produced in a fluid state, which remains united with the vegetable recrements, or with volatile alkali, or calcareous earth. 2. The parts of the soil become better incorporated, and thus reciprocally ameliorated; so that they may afford more uniform nourishment to the roots of plants. 3. The pulverized soil is more easily penetrable, and thus exposes a greater surface of its cavities to the vegetable absorbents. 4. All unprofitable plants, or weeds, being thus eradicated, or continually ploughed under the soil, while yet young, a considerable proportion of vegetable nutriment will be reserved, and farther increased, by the saccharine and mucilaginous matter of the young vegetables buried by the plough. Lastly, some plants, during their herbaceous state, do not exhaust the ground on which they grow, before the seed-stems arise; as turnips, for instance, when pulled up, and carried away for the purpose of feeding cattle, or sheep, on other grounds. This benefit appears to arise from the soil being shaded by the thick foliage of those vegetables, and consequently ameliorated; for its nutritious properties cannot have suffered by evaporation so much, as if the land had been exposed to the scorching influence of the sun.

Dr. DARWIN, when treating on this subject, justly observes, that, though a summer fallow may be of advantage to a poor soil, which has nothing to lose, yet it must be injurious to a rich one, which has nothing to gain.

A *Fallow-cleansing Machine* was invented by a Mr. AARON OGDEN, a smith, at Ashton-under-Line, near Manchester. It consists of two large rollers, armed with iron spikes, to which the inventor prefixed an harrow so constructed, that it may be set to go to any depth in a furrow, without *weighting*; and will pulverize the soil, raise the roots, or weeds, to the surface, and at the same time not be obstructed by their accumulation, though it should raise as many weeds as would load a cart within the thort space of five yards. There are several other pieces of machinery belonging to this implement; but as they are intricate, we refer the reader to the 3d vol. of the work, entitled "*Museum Rusticum et Commerciale*," where its parts are minutely described, and illustrated with a plate.—The design of this machine is to clear fallowed land from quick and all other weeds, in a better and more expeditious manner than is effected by manual labour; and Mr. Ogden is of opinion, that two men, with three horses and his implement, may perform as much work as forty men in the ordinary way, beside saving one fallowing season; an object of the utmost importance to the speculative farmer.

Family-Diet. See Diet, p. 135.

Family-Mill. See Mill.

FAN, a well known contrivance employed chiefly by females to raise wind; cool the air by agitating it, and defending their complexion.

This kind of toy was introduced into Britain from the East, where it is very generally used for shading the face from the sun, and guarding it against troublesome insects. Although the practice of fanning be sanctioned by fashion, it does not appear to be conducive to health, nor consistent with the operations of Nature; because the evaporation of perspirable matter on the human skin has a greater tendency to cool the body, than the incessant fanning, wiping, and rubbing of the face. Nevertheless, fans may be useful for affording protection against the rays of the sun, for which purpose, however, *parasols* will be more convenient.

Fan is also an implement of husbandry, employed for winnowing corn.—See Winnow.

FARCY, a disorder peculiar to horses, but which sometimes also affects oxen, and other cattle.

The farcy is infectious, and spreads among horses, in a manner similar to the distemper. It arises from vitiated blood, and is attended with eruptions of hard pustules, knots, or strings along the veins, and also with ulcers; which are not easily cured.

This malady is generally occasioned by sudden changes of excessive heat and cold; it may also take place when the animal is galled by rusty spurs, snuffle-bits, &c.; or after being bitten by an infected horse.

The method of cure prescribed for this disorder, is first to *fire*, that is, to perforate the ulcers or parts affected with hot irons; after which two drams of red precipitate finely ground, one ounce of Venice treacle, and as much *Diapente* powder (see Horse-medicines) as will be sufficient to incorporate those ingredients, are to be made up into a bolus, and given to the animal affected. Two handfuls of rue, four ounces of the roots of madder and sharp dock, together with two ounces of guaiacum, and an equal quantity of sassafras, are then to be boiled in four pints of stale beer, till they are reduced to three; when the infusion is to be strained off, and administered while lukewarm. The bolus and infusion are to be repeated two or three times in the week, during which period the animal should drink only warm water: and in the course of ten days, or a fortnight, he will in general be perfectly restored.

Farina. See Flour and Pollen.

FARM, a small district of land, on which is erected a house, with other conveniencies; hired or taken on lease, or otherwise, for the purpose of cultivation.

Having already, in the course of this work, discussed various subjects of rural economy, we shall at present confine ourselves to *experimental farms*, as the articles necessarily connected with farming, appear in their alphabetical order.

The national importance of agriculture appears to be universally admitted: and though much has been said by others on this subject, we cannot but consider the engrossing, or concentrating of several farms into one, as a principal cause of the poverty discernible among the lower class of husbandmen, and the late exorbitant price of provisions. Population thus necessarily becomes checked; for many industrious persons who, while in a state of servitude, would be storing up their little earnings against a future period, are deterred from settling, by the dismal prospect of being unable either to support themselves as day-labourers, or to take a farm consisting of several hundred acres. Hence such individuals as are better provided with pecuniary means, enjoy what would otherwise maintain perhaps *ten* small farmers and their families, together with such assistants as it would be requisite for them to employ.

In reflecting on this topic, it is matter of just astonishment, that no experimental farm, though frequently proposed, has been hitherto undertaken, in a country where agriculture is peculiarly valued;—as, in the western hemisphere, where the arts and sciences are still in their infancy, various institutions of this nature have lately been established. The following plan of a *grain-farm*, is extracted from the observations of Mr. BORDLEY, an intelligent American, whom we have repeatedly mentioned.

Acres.	
20	Pulse and roots, fallow crop.
20	Barley.
20	Clover.
20	Wheat.
20	Clover.
20	Rye.
120	acres in six fields.

Acres.	
$17\frac{1}{7}$	Maize, fallow crop.
$17\frac{1}{7}$	Ditto, for which may occasionally be substituted buck-wheat.
$17\frac{1}{7}$	Barley or rye.
$17\frac{1}{7}$	Clover.
$17\frac{1}{7}$	Wheat, which may be sown with buck-wheat and clover, if the soil be rich.
$17\frac{1}{7}$	Clover.
$17\frac{1}{7}$	Roots.
120	acres in seven fields.

The first course requires one of the fields to be continued in clover for two years, unless it be cultivated with buck-wheat, potatoes, or other roots; when the first year's clover is turned in, after the spring mowing. The potatoes (in America) should be planted in June; for in that late season the roots, while *bulbing*, will receive little injury from the scorching heat of midsummer. Mr. BORDLEY recommends them in preference to buck-wheat; as this, by running to seed, is apt to impoverish the soil: on the contrary, potatoes, turnips, and other roots, do not materially exhaust the soil; and, if properly cultivated, are, in his opinion, even meliorating.

If, according to this plan, one field be manured in each year, the six fields, consisting of 20 acres each, will be all manured in rotation; and those containing 17 acres each, in seven years: an object of the utmost importance, as, independently of the abundant crops raised in consequence of this operation, the soil will thus renew its fertilizing properties.—The net produce of the different sorts of grain and pulse, as well as their respective quality and specific gravity, ought, in each experiment, to be minutely recorded. Mr. B. proposes to continue the annual manuring of each field in rotation; and particularly recommends the saving of the dung in compact masses, sheltered from the sun; and also, in some measure, from the rain: though he allows, that the manure is not materially injured by the dropping of the rain on the area of the dung-heap, as some portion of moisture is absolutely necessary for promoting its fermentation. He farther advises the making of experiments on detached parts of the soil with lime, gypsum, clay, &c. in order to ascertain with precision their effects on different soils.

In the 4th volume of *Annals of Agriculture* (1785), Mr. ARTHUR YOUNG bitterly and justly complains of the unpardonable neglect and indifference shewn to the interests of agriculture, by the Sovereigns and courtiers of all ages and countries. Since that period, however, an exception prevails in Britain; a Board of Agriculture has been established; and though we cannot boast of many evident advantages which have resulted from that excellent institution, yet there is every prospect that a national or experimental farm will, at length, be adopted, in order "to hold out as an example to the nation, the most vigorous system of modern substantial improvements in husbandry." As the late President, Lord SOMERVILLE, has proposed such an establishment to take place only after the expiration of four or five years, we devoutly hope the first President of that Board, Sir JOHN SINCLAIR, will be enabled to carry this desirable measure into effect, by private subscription, at a much earlier period.

With respect to the expences and profits of farming, we cannot enter into any detail, as such particulars necessarily depend on peculiar circumstances. The common allowance on a farm, was, in Mr. TULL's time, *three* rents or assessments; one for the landlord, a second for the expences, and the third for the tenant's subsistence, and for other purposes. There are, however, few farms, even in the present improved state of agriculture, that will constantly afford this increase, or which can be carried on, and maintained at such a charge. For instance, in a farm worth 100l. per annum, if the land be worth 20s. per acre, 100l. will perhaps be sufficient to defray the expences necessarily incurred. But, if the soil of a farm, which is lett at the same total amount of rent, be worth only 10s. per acre, an allowance must be made of 120l. or 180l. per annum, at the least for charges; and 250 acres of land must be computed to be the extent of the farm, in order to make up the rent, otherwise considerable loss will necessarily be incurred, unless the land be capable of great improvements. It should, however, be remarked, that these proportions subsisted in England about 80 years since, but are now greatly altered; for instance, an acre of land then rented at 20s. per annum, pays at present from 2l. to 3l.; and the price of manual labour is raised nearly in a similar proportion.

According to the modern improved state of agriculture, the expence of cultivating a farm of 1000 acres, consisting partly of pasture, arable, meadow, and other land (the annual rent of which is, by Mr. MACRO, of Barrow, Suffolk, stated to be 415l.) amounted in the year 1786, to 2208l. 2s. and 6d.—In order to balance this expenditure, the profits of a farm should be about *five* times the annual rent; and, if the combinations of engrossers be suffered to proceed with impunity, they will, no doubt, in a short time, amount to *six* or *seven* times the value of the rent actually paid.

FARM-HOUSE, in rural economy, is applied particularly to the dwelling occupied by a farmer.

The principal objects to be attended to in erecting farm-houses are, convenience, and a salubrious situation; points highly important to every inhabitant of the country, as the health and welfare of all, in a great measure, depend on the choice of the latter.

Beside the general salubrity of the spot where dwellings are to be erected, the *air*, *water*, and *soil*, also require to be particularly attended to; the first should be pure and temperate; the second, wholesome and easily obtained; and the soil, rich.

The most healthy place of the farm ought to be selected for building the house, which should be exposed neither to the summer heats, nor to the rage of winds and storms during winter. Many parts of this country abound with rivulets and streams, which, however, are seldom attended to, though a judicious choice, in this respect, is of the utmost consequence. A quick flowing stream, that has a clean channel and dry banks, will considerably add to the beauty and healthiness of the place; but, if the water be over-run with weeds, or other strong grass, such a situation should be carefully avoided; for, as it affords a secure shelter to every kind of putrid filth, noxious vapours will arise, and produce effects very injurious to health. If, nevertheless, such places must unavoidably be chosen, a northern aspect is preferable to a southerly one; for, as the north winds blow more briskly than those from the south, the air is in general cool, putrefaction is checked, and there will not only rise fewer vapours, but in consequence of the greater density of the air, they will be speedily dissipated.

Respecting the construction of farm-houses, we have little to add. Instead, however, of thatching them, it would be highly desirable that they should be uniformly covered with slate, or tiles, in all situations where these materials can be procured. But, where neither slate nor tiles can be had, we recommend the covering, both of farm and out-houses, with heath or ling: either, when well laid on, is preferable to straw; and at the same time so cheap, that in any country adjoining to heath-moors, it may be procured for the mere labour of cutting and carrying it to the premises.

Having already, in former parts of this work, communicated a variety of practical directions, relative to the construction of houses, in general, we refer the reader to the articles BUILDING, CEMENT, and COUNTRY-HOUSE.

FARRIERY, the art of preventing, curing, or alleviating the disorders of horses.

The practice of this useful profession has, till within the last 15 or 20 years, been almost entirely confined to a class of men, who were utterly ignorant of the anatomy of the horse, and the general principles of the art of healing. Their prescriptions were as absurd as the reasons they assigned for administering their draughts, bolusses, drenches, &c. An institution has at length been established, where the diseases of that noble animal, the horse, are the subject of peculiar attention; we mean the *Veterinary College*, which, we are happy to state, is patronized by the most respectable of the nobility and gentry.

As, however, in this work, we treat of the principal diseases, as well as the shoeing and general management of the horse, in their alphabetical order, we shall here only mention a few of the most esteemed works published on farriery; namely, Mr. CLARK's "*Treatise on the Diseases of Horses*" (8vo. 8s. 6d.); his "*Observations on the Shoeing of Horses*" (8vo. 4s.); Mr. TAPLIN's "*Gentleman's Stable Directory*" (2 vols. 8vo. 15s.); and likewise, Mr. LAWRANCE's "*Philosophical and Practical Treatise on Horses*" (2 vols. 8vo. 17s. 1797); from which the inquisitive reader may collect the latest and most essential improvements made by English farriers.

Concerning the propriety of administering HORSE-BALLS indiscriminately, on the suggestion of ignorant blacksmiths; or of resorting to the most absurd external applications, such as BAGS for recovering a lost appetite, while the *proper* internal remedies are neglected, we shall briefly remark, that such conduct is equally injudicious, as the blind reliance on quack-medicines; though it were to be wished, that the latter may be exclusively given to horses and other cattle.

FARTHING-BOUND. See COW, p. 89.

FASELNUT, or *Areca catechu*, L. one of the most curious Indian plants, which attains its greatest perfection in the island of Ceylon. It grows to the height of 25 or 35 feet, without any branches, but has very beautiful leaves; the trunk is remarkably straight, and the leaves form a round tuft at the top. Its fruit is contained in a yellowish shell, externally smooth, but rough and hairy within, resembling that of a cocoa-nut, though in size not exceeding a large walnut; its kernel is not unlike a nutmeg, and contains in its centre, while soft, a greyish and almost liquid substance. The ripe fruit is astringent, and its consumption in the East Indies is perhaps more general than that of tobacco in Europe; as every person chews it, together with the leaves of betel, after mixing with it lime made of sea-shells. This mastication occasions much spitting, cools the mouth, and fastens the teeth and gums; it is likewise said to sweeten a *fetid breath*, and to strengthen the stomach: for these conjoint purposes it may, even in our colder climate, be advantageously employed; and as we possess perhaps no plant of similar efficacy, it might be easily imported.

FASHION, in general, signifies the prevailing mode or taste, and is particularly applied to dress. In this respect, it frequently supplies the place of reason; especially when the two principal rules, namely, *propriety* and *conveniency*, are neglected.

We cannot enlarge on this article; which, though it frequently undermines the health of blooming youth, and frustrates the fondest hopes of parents, yet is supposed essentially to contribute to the flourishing state of trades and manufactures: hence we doubt, whether the most appropriate censure of that tyrant, whose shrine is revered by all the young, the gay, and the frivolous, would be productive of any good effects. This much, however, we venture to say, that *fashion*, when trespassing either on the rules of health, propriety, or convenience, ought to be universally exploded; and treated with a similar degree of silent contempt which *moral and political innovations* generally experience, when they are not supported by a just and solid basis.

FASTS, or FASTING, denotes abstinence from food, particularly for religious reasons.

Fasting has been transmitted to us from the earliest ages, as a duty necessary to be performed at certain periods, in order to deprecate those calamities, with which the innate depravity of man is said to be justly punished.

Having already considered the effects of *fasting*, under the head of ABSTINENCE, we shall only add, that it is particularly injurious to tender and debilitated habits, in the early part of the day; because the fluids of the human body, after circulating for several hours without any alimentary refreshment, at length acquire a putrid tendency, which is obvious from the strong alkaline breath of the most healthy person, after rising from his nocturnal couch. There are, however, instances of fanatics, who have subsisted for many days, and even weeks, without any sustenance; but, though such persons may occasionally survive these unnatural attempts, yet their health is, in consequence, miserably impaired.—Similar effects often arise from a *total* abstinence from animal food, whether on account of religious or other motives.—Thus, a late Professor in the University of Glasgow, shortened his life, by abandoning the use of flesh meat at an age exceeding 60 years: and, after living upon vegetable aliment about six months, he was reluctantly obliged to resort to his former mode of diet; but these changes had so unfavourably affected his constitution, that he died in a very short time after making the experiment.

FAT, an unctuous, solid substance, deposited in little membranous cells, in various parts of animal bodies: it serves to defend the muscles and bones against cold; to temper the acids of aliments; and probably to the support of the whole frame.

The fat of several animals was formerly kept in the druggist's shops, as hog's-lard, the fat of deer, geese, and also human fat.—With respect to their real virtues, much depends on the manner in which they have been purified and preserved.

The method of preparing fat for medicinal purposes is, to remove all veins, skins, fibres, &c.; when it is to be washed, till the water comes from it perfectly insipid and colourless. After this preparation, the fat is to be melted by a gentle heat, with a small quantity of water, till the latter be evaporated; it is then to be strained off into an earthen vessel where it will settle, and be preserved from the air. When thus purified, fat is almost totally divested of taste, and smell.

With regard to the properties of fat, and marrow, when used as food, they produce a solid and nourishing juice, increase the blood and fluids in general; but are difficult to be dissolved, and apt to become rancid on the stomach of many persons, whose digestive powers are weak, and who are not accustomed to take much exercise. Hence, if fat be not duly assimilated to the fluids, it impairs the stomach and bowels, occasions diarrhœas, heart-burns, head-achs, and spasms, especially in those whose habits are easily irritated.

FAT-HEN. See Wild ORACHE.

FATNESS. See CORPULENCY.

FATTENING OF ANIMALS. See BULLOCK and CATTLE.

FATTENING of COLOURS, is a term employed by painters, and signifies a coagulation of the oil, which is occasioned by mixing it with several kinds of pigments: hence, when it has been kept for a considerable time, it becomes so viscid and glutinous, as to be wholly incapable of being worked, either with the brush or pencil. In this state, a due proportion of fresh oil should be added.

Colours will also *fatten*, after they have been laid on the proper ground; so that one part of the oil will run off in small streams or drops, while the other adheres to the canvas with the colours, but without drying.—This defect, we conceive, may be remedied by evaporating the watery parts of the oil, and grinding the colours more carefully, so as to prevent their precipitation.

Oils will likewise *fatten*, when they have been too long kept, or exposed to the sun and air.

FEA-BERRY. See Rough GOOSEBERRY.

FEATHER, a general name, expressing the covering and wings of birds, by which they are enabled to fly.

The feathers chiefly used in this country, are those of geese, from which animals they are plucked three, four, and even five times in the course of one year: thus, in cold seasons, many of these birds fall victims to that barbarous custom.—The feathers obtained from the county of Somerset are esteemed to be the best, as those brought from Ireland are reputed to be the worst.

Great quantities of goose and other feathers are annually imported from the North of Europe; which, however, are insufficient for the demand: hence poulterers dispose of vast numbers of the feathers of cocks and hens, and also of ducks and turkies; all of which are much inferior to those of geese.

The best method of curing feathers is, to expose them to the sun in a room; and as soon as they are thoroughly dry, to put them loosely in bags, in which they should be well beaten, in order to cleanse them from all dust and filth.

Feathers are chiefly used for the stuffing of beds, which are certainly less wholesome than wool or horse-hair mattresses, and tend greatly to relax and enervate the human body. Within the last two or three years, they have been manufactured into hats; a mode of employing them, far preferable to that we have just mentioned.—See Plume.

FELT, a kind of stuff, which derives its consistence merely from being fulled or wrought with lees and size, without being either spun or woven. The mechanism of felting is equally simple and curious; though its *theory* is little understood, even by professional hatters.—As the surface of hair and wool is by no means smooth, but formed either of plates resembling the scales of fish, or of zones placed over each other, as we find in the structure of horns, it follows that hair or wool, when promiscuously entangled, cannot be easily disengaged, on account of its rough sides, which may be readily perceived, by drawing a hair between the fingers against the root-end. Thus, each inequality of surface accommodates itself to that of another hair, and forms at length a natural texture.

Felt is made either of wool alone, or of a mixture of that article with camel's or other hair, and is used principally in the manufacturing of Hats, to which we refer.

FEN, a place overflowed with water, or abounding with bogs.—See Bog and Draining.

The most extensive fens in this island, are those of Lincolnshire, which afford considerable advantages to the inhabitants, who take large quantities of fish, and wild fowl; the latter are even sent to the London markets.

Fens generally abound with saline plants, which are very nourishing to cattle, and exceedingly fattening to sheep and horses. Oats will also thrive well in several fen districts; and, in prosperous seasons, yield abundant crops.

Coleseed is likewise cultivated to a very considerable extent on the fens, which indeed might be made more fertile, if the practice of paring and burning them, to the depth of an inch and a half, were more generally adopted.

Several acts of parliament have been passed for draining the fens, chiefly in the counties of Kent, Cambridge, and Lincoln; and by 2 Geo. II. c. 34 and 39, commissioners are appointed, for the effectually draining and preserving of fens in the isle of Ely; who are empowered to construct drains, dams, and other works; they are likewise authorized to make an assessment on the land-holders, whose lands, in default of payment, are liable to be sold.

Fen, the name of a very pernicious disorder, to which hops are subject. It consists of a kind of moss, or mould, which grows rapidly, and does considerable injury to the hop-grounds, unless it be eradicated immediately on its first appearance.

FENCE, in rural economy, is a hedge, wall, ditch, bank, or other inclosure, made round gardens, woods, fields, &c.

The fences employed for parks, and sometimes for gardens, are generally of paling; which, if made of *winter-fallen* oak, will continue sound for many years. For this purpose, the pales should be cleft thin, and the rails cut triangular, in order to prevent the wet from being deposited on them. In parks where fallow-deer are kept, it will be sufficient if they be 6½ feet high; but where there are *red* deer, it will be requisite to make them at least one foot higher.

Various kinds of *plants* have been recommended for constructing the common fences, of which we shall point out the principal: 1. The WHITE-THORN is the most proper for fences, as it grows quickly, is very durable, and makes a very handsome appearance. It thrives on any soil, where a ditch and a new bank are prepared for its reception, unless the soil consist entirely of sand or gravel: it will nevertheless grow even in such situations, if the planting be succeeded by heavy rains. 2. BLACK-THORN is another excellent shrub for a fence: it is, however, much inferior to the white-thorn, as its growth is not so certain; and, where it thrives, its roots spread, and are apt to *run in* too much upon the land. For dead hedges and mending open places, the bushes of this plant are superior even to the white-thorn; they are likewise less liable to be cropped by cattle. 3. FURZE, to which we refer. 4. To these may be added the HOLLY, which is indeed preferable to either of the plants above-mentioned: for, though its growth is slower, and more uncertain, yet where it succeeds, it amply compensates for the delay and expence incurred, by its thickness, height, and strength.

The best mode of making a fence with these trees is, to plant them with the quick or white-thorn, in the proportion of one of the former to four of the latter. Both will flourish; and, as the hollies increase in size, the white-thorns may be pulled up: so that when the trees have attained their full growth, they will require the whole of the space occupied by the thorns, and will make a most durable fence. If any vacancies should intervene, they may be easily closed, by bending down, and covering the lower branches with earth: thus, they will shoot forth in the ensuing year, and form a barrier impenetrable to cattle.

Beside these, alder, and even elder, make, in certain situations, excellent fences. If sticks or truncheons of the latter, from ten to twelve feet in length, be set in a sloping direction each way, so as to form a kind of chequer-work, they will grow speedily, and continue for several years. This plant is excellently adapted to watery places, as its lowest roots are continually spreading, and thus prevent the banks on which they stand, from being undermined, or washed away by the current.

The last tree which we shall mention is the HORN-BEAM. It is chiefly used in Germany for the purpose of fencing lands; and is propagated from sets or slips, which are planted on a parapet of earth, with a ditch on each side, in such a direction that every two plants may intersect each other. The bark is then scraped off the place where they meet, and which is covered with bands of straw: in consequence of this operation, the two plants become conjoined, and put forth horizontal slanting shoots, forming a kind of palisade; which, if lopped annually, will render every part of the fence equally impenetrable to men and cattle.—See HEDGES.

FENNEL, the COMMON, or Fennel Dill, *Anethum fœniculum*, L. a native perennial plant, growing on chalk cliffs, and common on the western coasts. Its yellow flowers appear in July or August.

The tender buds of this aromatic plant are useful in salads; its leaves are boiled, and used in sauces for several kinds of fish, and also eaten raw with pickled salmon, &c.—

The seeds yield an excellent aromatic oil, which is carminative, resolvent, and diuretic, without heating the body: on account of these valuable properties, as well as for its strong, pulpy, and esculent root, this plant is industriously cultivated on the Continent: it delights in a rich, but not too moist soil; and the seed is put in the ground soon after it becomes ripe.

There are two varieties of this excellent vegetable reared in Italy, both of which might be cultivated in Britain; namely, 1. The *dulce*, or sweet fennel; and 2. The *azonicum*, or Italian fennel. The former easily degenerates, and requires a frequent supply of seeds produced on its native soil; the latter is a delicious plant, the stalks of which, according to BECHSTEIN, are thick, pulpy, and from four to five inches broad: they are highly esteemed by the Italians, who blanch and eat them as salad, prepared with flour, vinegar, and pepper. Hence the popular adage in that country, according to which "fennel and bread are the Italians' repast."

FENNEL, the WATER: See Water STARWORT.

FENUGREEK, or *Trigonella fœnumgræcum*, L. is a native of the Southern parts of France, Germany and Italy, whence its yellowish seeds are annually imported. They possess a strong, disagreeable smell, and an unctuous, farinaceous, and somewhat bitter, taste. These seeds are chiefly employed in cataplasms, and fomentations, for softening, maturating, and discussing tumors: they are also occasionally used in emollient and carminative clysters.

FERMENTATION is, strictly speaking, a chemical process, and one of the most obscure phenomena in nature, which all the ingenuity of philosophers has hitherto been unable to explain. Instead, therefore, of perplexing the reader with different theories on the subject, we shall briefly relate the practical part of this interesting process, together with the circumstances attending it.

Fermentation may be defined to consist in a visible internal commotion of different bodies, reduced to a fluid state; emitting bubbles of air, and a sparkling, pungent, vapour. But, more properly speaking, it is a gradual and spontaneous change of a body, consisting of different ingredients variously mixed, and which are now decomposed and converted into a vinous liquor. Thus we obtain, according to the methods afterwards pursued, wine, ardent spirits, beer, or vinegar.—Hence fermentation is confined to the vegetable and animal kingdoms; and is divided into *three* regular stages; namely, the *vinous*, *acetous*, and *putrefactive*. Vegetables only are susceptible of the first; the flesh of young animals in a slight degree undergoes the second; and all animal substances are peculiarly subject to the last stage, or putrefaction.

The most essential requisites in every process of fermentation, are: 1. That the substances be in a fluid state; 2. That there be a proper degree of uniform warmth, that is, in general between the 70°. and 80°. of FAHRENHEIT'S thermometer; and 3. That the atmosphere be not entirely excluded from the fermenting bodies, nor that they be exposed to a current of air.

If, in the elementary mixture, or component parts of a vegetable body, there exist a portion of inflammable air, this spirituous ingredient will be disengaged at the very commencement of fermentation: hence we obtain wine, brandy, cider, beer, &c. from grapes, apples, pears, and other fruit, from every species of corn, as well as from saccharine and mealy roots. Their productions, however, so far differ from each other, that wine contains a greater proportion of spirituous, and less of mucilaginous particles, than beer; and that distilled spirits are deprived of all earthy and viscous ingredients. But, as all fermentable bodies, beside the inflammable spirit, possess a portion of acid and saline particles, which are not disengaged during the first, or *vinous* stage of fermentation, another separation of constituent parts takes place, immediately after the former is effected, without any farther discharge of air-bubbles, or intestine commotion of the fluid; though a volatile elastic vapour is observed to escape: thus, the spirituous parts, unless they have been previously drawn off by distillation, are communicated to the atmosphere, and this stage is termed the *acetous* fermentation; because its productions are the different sorts of vinegar obtained from wine, beer, fruit, corn, &c.—Although, in most of the fermentable substances, these two stages naturally succeed each other; yet, by improper treatment, the acetous fermentation sometimes appears before the vinous can possibly commence, especially where the process is mismanaged by too great a heat; or, in those bodies which possess little or no inflammable matter in their elements. On the contrary, such vegetables as originally contain a sufficient proportion of *aërial* and *fiery* constituents, will easily ferment, by the simple means of warmth and water. But, if those elementary ingredients be in a manner deprived of their activity, by too many crude and viscid particles being combined with them, it will then be necessary to make certain additions, partly natural, and partly artificial, in order to dispose them more readily to ferment. These means, or additions, are such as have either already undergone fermentation; or are easily disposed to ferment: of the former kind are *yeast* and *leaven*; of the latter, honey, sugar, especially in a state of molasses, and other sweet substances, which, however, but slowly promote fermentation; nay, if they be previously diluted or dissolved in too hot water, and in that state added to the fermentable materials, they will entirely check that process. There are, besides, other means of promoting it; for instance, the dried leaves of the vine in a state of powder; cream of tartar, especially after it has been repeatedly moistened with strong vinegar, and afterwards dried; the crumb of bread prepared in a similar manner, and reduced to powder, &c.

If fluidity, warmth, and fresh air, forward the fermentative process, the contrary of these, namely, dryness, cold, and exclusion of air, inevitably tend to prevent it.—There are, however, cases in which it may become necessary to impede its progress; and we may then safely resort to the means above alluded to.—But *a certain degree of heat*, such as we have before stated, appears to be indispensably necessary to conduct that process with success: an undue continuance, or the least increase of heat, proves detrimental, while an appropriate temperature, in a remarkable degree promotes fermentation. These different points of heat should be accurately noted and settled by the thermometer, or other certain methods; though, for common, or all economical purposes, they may be limited to what is in general termed a *tepid* and a *fervid* heat: the former is the bane of all vinous fermentation; the latter, or imperceptible warmth, is the great promoter of it. And if, notwithstanding a due attention to a proper temperature and all other circumstances, the liquor will not work of itself, it should then be assisted by such substances as are called *ferments*, and of which we have already given some account.

In the Memoirs of the Philosophical Society at Manchester, Mr. HENRY states the result of some experiments, in which he produced a fermentation both in bread and wort, and even in punch and whey. Conjecturing, therefore, yeast to be simply a quantity of fixed air detained among the mucilaginous parts of the fermenting liquor, he boiled some wheaten flour and water to the consistence of a thin jelly, which he put in the middle of Dr. NOOTH's machine for communicating fixed air to water. A considerable portion of gas was absorbed; and the next day the mass was in a state of fermentation.—The third day it bore so great a resemblance to yeast, that an experiment was made on some paste for bread; for which purpose it answered tolerably well, after being baked four or five hours.

Mr. HENRY made another experiment with some wort only; part of which was impregnated with air in the same manner as the flour and water, and when poured into the remainder, a brisk fermentation ensued in 24 hours; a strong head of yeast began to collect on the surface, which on the third day was fit for tunning. In the course of the experiment, good bread was made with the yeast taken off the surface.

The dispute which has arisen concerning Mr. HENRY's mode of producing fermentation, may be easily decided by a comparative trial. Let two gallons of wort be put into a separate vessel, and kept in a moderate heat for a certain time: let also two other gallons be impregnated, either wholly or in part, according to Mr. HENRY's method, be put into a similar vessel, and deposited in the same place. If the fermentation commence in the liquor impregnated with fixed air sooner than in the other, the air may be rationally conjectured to induce such fermentation. At all events, Mr. HENRY's experiments, with respect to bread, are certainly decisive, and those relative to liquors may thus be easily ascertained; an object of the utmost importance to the public.

FERMENTED LIQUORS, are those obtained by the process described in the preceding article. See also BEER, BREWING, CYDER, WINE, &c.

All liquors which have undergone the vinous fermentation, are considered as great *antidotes to putrefaction*: hence the total abstinence from them is assigned as one of the chief causes why the Turks are more liable to the plague, and other contagious diseases, than those nations among whom beer or wine is the common beverage. It has farther been remarked, and perhaps with justice, that since the custom of brewing and distilling liquors has prevailed in Europe, many of those cutaneous as well as putrid diseases, with which our forefathers were afflicted, have been less severe, and less frequent than they occurred in former ages.

On the other hand, it is certain that all fermented liquors contain a considerable portion of air, which appears to combine the spirituous with the viscous parts, and which must necessarily be disengaged, before they are carried through the different organs of secretion. The developement and discharge of these aërial particles, however, is not effected without considerable efforts: hence it may be safely asserted, that fermented liquors are less conducive to a sound and vigorous digestion of food than plain water. Yet, with respect to their influence on the human mind, it cannot be denied that such liquors in general have the effect of enlivening and exhilarating the spirits, especially of those who are naturally deficient in mental energy, or possess a weak and debilitated frame. Some writers, however, are of opinion, that they also have a strong tendency to corrupt the morals of mankind; an effect which they evidently produce, even in temperate climates, when taken to excess. On the whole, we think a moderate use of malt liquors and wine, is less injurious to the body than the daily drinking of tea, coffee, and other *hot* liquors, which threaten to *emasculate* the present and future generations.

FERN, the FEMALE, or *Pteris aquilina*, L. an indigenous plant, growing on heaths, in woods, and dry barren places, and flowering in the month of August.

This weed is extremely difficult to be eradicated, as its roots, in soft and deep soils, have been found at the depth of *eight* feet. One of the most effectual methods of extirpating the fern is, to mow the grass frequently; and, if the field be ploughed up, and well dunged, this plant will not thrive:—urine is said to be of considerable efficacy in checking its vegetation. It may also be easily destroyed, by means of an instrument consisting of a stick, in which is inserted a blade, with blunt edges, and with which the stems of the plant are to be bruised. Several acres may thus be cleared, even by a woman, in the course of one day: the next morning a gummy matter will exude from the injured stalk, and the fern will gradually disappear.

But, however troublesome this vegetable may prove to the industrious husbandman, it is not altogether useless, and might well deserve to be regularly cultivated in those places where few other vegetables will grow.

For covering the roofs of houses, fern affords a valuable substitute for straw: in order to apply it to this useful purpose, it should be pulled up together with its roots, in the beginning of October, when it is perfectly pliant, and not liable to break: if these precautions be attended to, the thatch will continue sound for thirty years. It also produces excellent litter for horses and cows; and when dry, is eaten by cattle, for which purpose it should be cut from the middle of August to that of September. Hogs are particularly fond of its roots, which render them exceedingly fat; and, it has been found by experience, that, if the stalks be scalded for a few minutes, and mixed with bran, for *store* hogs, half the quantity of bran will be saved; so that from February to June these animals may be kept at one half of the expence, by a weed growing abundantly on waste lands. It ought, however, to be remarked, that young pigs should not be fed with this plant, as it is naturally too heating for them, and might be productive of dangerous consequences.

Fern may also be employed as an excellent manure for potatoes: for, if it be buried beneath the roots of the latter, it seldom fails to produce a good crop.—It is likewise a proper substitute for coal, where the latter is scarce, for the various purposes of brewing, baking, heating ovens, and burning lime-stone, as it emits a powerful heat.

The ashes of fern, when burnt, are frequently used by the manufacturers of glass, especially in France, because they afford a tolerably pure alkali.—In several parts of Britain, the poorer class of people mix these ashes with water, and form them into round masses, which they call *fern-balls:* these are next heated in a fire, before they are made into a lye for scowering linen. M. Friewald observes, in the 4th volume of the Transactions of the Swedish Academy, that his countrymen mix the fern ashes with a strong lye, previously to forming them into balls, and afterwards dry them: thus, a very cheap substitute is prepared for soap; and the linen washed with it, not only becomes perfectly white, but is at the same time free from that disagreeable smell, frequently contracted by linen imperfectly washed with the common soap.—According to Prof. Beckmann, fern produces the 9th part of its original weight, when burnt to ashes; and Scheffer, in his *Chemical Lectures*, published in German, remarks, that it yields the largest proportion of ashes among all known vegetables. M. Gmelin even affirms, that it affords no less than the third part of its own weight in vegetable alkali.

Beside the multifarious uses to which the fern is subservient, it may be applied to a purpose still more important. In the "*Memoires d'Agriculture*," for 1786, we find that this vegetable furnishes the inhabitants of Palma, one of the Canary isles, with their *daily bread:* in digging for its roots, they first taste them, and reject those which are bitter, as useless. Such facts require no commentary.

FERN, the Male, or Male Polypody, *Polypodium Filix-mas*, L. is an indigenous plant growing in woods, heaths, and stony places, and flowering from June to October.

This vegetable has nearly the same qualities, and is used for the same purposes as the female fern, In Norway, the dried leaves are infused in hot water, in which state they afford a wholesome food to goats, sheep, and other cattle, which eat them eagerly, and sometimes grow fat by their constant use.—The inhabitants of Siberia boil the male fern in their ale, on account of the flavour which it imparts to that liquor. The roots, when pulverized, are an excellent vermifuge, and have been given with great success, in the proportion of two or three drams, for the expulsion of the *tænia*, or tape-worm.

FERRET, or *Mustela Furo*, L.

an useful animal, which is originally a native of Africa, whence it was introduced into Spain, and subsequently into this country. It has red, fiery eyes; the colour of its whole body is of a pale yellow; and its length, from the tip of the nose to the end of the tail, is about 19 inches.

The ferret requires to be kept carefully within doors, as, unlike other wild animals, it is incapable of procuring its own subsistence.—The female is of a smaller size than the male, and produces twice annually from five to six, and sometimes even eight or nine young ones, after a gestation of six weeks.

These animals are employed for the purpose of hunting rabbits, to which they are mortal enemies. They are always muzzled previously to being admitted into the burrows, in order that they may not kill the rabbits, but only drive them out of their holes into nets, spread out for the purpose of taking them. In the West of England, they are frequently kept in farm-yards and barns, for the purpose of destroying the mice and rats infesting corn-stacks.—Ferrets are reared in casks or boxes, where they are provided with beds of hemp or flax. They sleep almost continually, and, on waking, very eagerly search for food, which consists chiefly of bread, milk, &c. They are easily tamed, and rendered docile, but are extremely irascible; and, as they at all times emit a disagreeable odour, it increases and becomes extremely offensive when they are irritated. Their motions are nimble; and they are at the same time so vigorous, that they can easily conquer a rabbit, which is at least four times larger than its adversary.

FESCUE-GRASS, or *Festuca*, L. a genus of plants consisting of 39 species; though only 12 or 14 are indigenous, of which the following are the principal:

1. The *ovina*, or Sheep's Fescue-grass, which is perennial, grows in dry, sandy soils, and flowers in the month of June. This plant is eaten by cows, horses, goats, and especially by sheep, which are very partial to it, and soon become fat from its use.

2. The *rubra*, Creeping or Purple Fescue-grass, which is perennial, grows on elevated heaths and dry barren pastures, and flowers in the month of June. This grass is of great value in the fattening of cattle, as its succulent leaves, which continue to vegetate during the whole summer, at all times furnish abundance of wholesome food. It also possesses the advantage of retaining its verdure throughout the winter, when almost every other vegetable is decayed.

3. The *duriuscula*, or Hard Fescue-grass, which is also perennial, grows as well in dry places as in low and flat meadows; and flowers in the month of June. It has not hitherto been cultivated, though it claims the attention of the intelligent farmer; for it frequently attains the height of three or four feet, shoots forth very early in the spring, is very luxuriant, and affords a wholesome and grateful food to all kinds of cattle.

4. The *elatior*, or Tall Fescue-grass, which grows in boggy meadows, and at the sides of wet ditches, where it often attains the height of four or five feet. It is perennial, flowers in the month of June or July (sometimes twice in the year), and makes excellent pasture, but requires a rich soil.—It

is eaten by horses, cows, sheep, and goats.

There is a variety of this grass, called by Mr. Curtis the *Festuca pratensis*, or meadow fescue-grass, which will thrive not only in very wet, but also in dry soils. This variety possesses a property, on account of which it deserves to be more generally cultivated, namely, that of producing abundance of seeds, which speedily grow, and are easily collected. It bears a close resemblance to ray-grass, though it is in many respects greatly superior to the latter, at least for the purpose of making and improving meadows; as it is perennial, larger, more productive of foliage, and very hardy.

5. The *fluitans*, or Flote-fescue grass, which is common in wet ditches, ponds, and marshy places; it flowers from June to September. This plant is remarkable for its small but very sweet and nutritious seeds: they are collected in several parts of Germany and Poland, under the name of *manna seeds*; and used in soups, gruels and puddings, both for their excellent aliment, and agreeable flavour. When ground into meal, the seeds may be converted into bread, which is little inferior to that made of wheat. The bran, separated in preparing the meal, is given to horses troubled with worms; but no water should be allowed these animals for several hours afterwards. Beside the useful purposes before mentioned, the flote-fescue is a valuable grass for cattle; being so remarkably grateful, especially to horses and hogs, that they will endanger their lives in obtaining it; but as it grows only in waters which have a miry bottom, it cannot be cultivated.—The Cottenham and Chedder cheese, in a great measure, derive their celebrity from this grass.

6. The *myurus*, or Wall Fescue-grass, or Capons-tail grass, which grows on walls, dry barren places, and road sides; it produces violet stalks from 16 to 24 inches high, and affords a sweet, nourishing pasture: hence it might be cultivated with advantage, on the poorest soil where few other grasses will thrive.

FEVER, a general term for a numerous and diversified class of diseases; in which, after shivering, succeed increased heat and a quick, irregular pulse; while several of the animal functions are impaired, and the muscular strength, particularly that of the joints, is remarkably diminished.

In most of the febrile actions taking place in the human body, Nature endeavours to remove some noxious foreign matter; and the evacuations which take place in fevers, are principally those by the pores of the skin, and the urinary passages, sometimes also by vomiting and diarrhœas, less frequently by hemorrhages or fluxes of blood, and very seldom by cutaneous eruptions.—In the small-pox and bilious fevers, especially of scorbutic patients, a discharge of saliva occasionally intervenes, which, though it cannot be called *critical*, ought never to be suppressed.

In all fevers, there is either an increased, progressive motion of the blood, which is manifest from the quickness of the pulse; or an accelerated internal commotion of the fluids, which is obvious from the unusual degree of heat accompanying them:—in most instances, however, both symptoms occur in the same individual. Hence, the proximate cause of these complaints appears to be morbid matter, contained in the fluids, and thence stimulating the nerves.—Frequently, indeed, an irritability of the nervous system alone seems sufficiently to account for the production of a febrile disease, yet in these cases also the *material* cause has probably pre-existed, and been only excited by the additional stimulus. On the other hand, a fever may arise from any debilitating or exciting cause; for instance, wounds, passions, acrid purgatives, &c. without any pre-disposition of the individual. Thus it may, in some measure, be explained, why rude and uncivilized nations are but seldom afflicted with febrile disorders; because these affections are peculiar only to persons of a nervous and relaxed habit.

The following facts render it highly probable that the morbid matter of fevers is much disposed to putrefaction: 1. All remedies which are successfully administered in fevers, are of the *antiseptic* class; such as salts, acids, camphor, Peruvian bark, &c. 2. Animal food is in almost every febrile case detrimental to the recovery of health. 3. The excrements are uniformly of a putrid nature. 4. All foul matters easily produce fevers; for instance, putrid exhalations and ulcers. 5. The generation of heat is most remarkable in putrid fevers, and continues even for some time after death.—It is nevertheless rational to suppose, that no fever can arise, even though a disposition should pre-exist in the solid parts of the body, till the nervous system becomes affected by the stimulus of acrid or morbid particles; and till a certain degree of acrimony has been generated in the fluids.

The remote or pre-disposing causes of fever may be ascribed either to an improper mode of living, with regard to the *six non-naturals*, namely, Air; Aliment; Exercise and Rest; the Passions and Affections of the Mind; Wakefulness and Sleep; Repletion, and Evacuation: or they are to be attributed to a certain general influence; such as famine, unwholesome provisions, an unusual and irregular temperature of the air, &c.

With respect to the more or less favourable *prognosis* in fevers, we shall only observe:

1. It is a favourable sign, if the efforts of nature are vigorous, and the evacuations do not take place till the febrile or morbid matter is digested; an event which rarely occurs previously to the 4th day, but generally on the 5th, 7th, 9th, 11th, 13th, 15th, 17th, 19th, 21st, 27th, and 31st day: hence these have been called the *critical days*; and, if this natural order cannot, in the present artificial state of society, be traced with the same accuracy as in former ages, such irregularity proceeds from the more frequent complication of diseases.—When the spasmodic strictures begin to abate, and the secretions, as well as the excretions, assume their natural colour and consistence, we may then conclude that the fever is on the decline: if, for instance, instead of a small, contracted pulse, a parched skin, and thin urine, the circulation of the blood become more uniform, the pulse softer and fuller, the urine more oily, and the discharges by stool be neither of a green colour nor too thin, a favourable change may then be expected to take place on the next of those days, termed critical.

2. Where the powers of the body are insufficient to expel the febrile matter, the symptoms become more aggravated; but there is no danger to be apprehended from them, unless there prevail too great debility. Thus, an intermitting pulse, bleeding, vomiting, giddiness, &c. are frequently the forerunners of the *crisis*; and the most violent fit of an ague is often the last,—not unlike continued fevers, when patients, during the last exacerbation, which terminates the disease, appear to struggle with death. If, therefore, the pulse becomes natural and proportionate to the strength of the patient; if respiration is no longer impeded; and a sound sleep succeeds the paroxysm, there is every prospect of a speedy recovery; but, if these changes have occurred only in a slight degree, the crisis may then be considered as imperfect, and the fortunate issue of the disease depends on the vigour remaining in the constitution. Lastly,

3. Should, however, the skin continue in a dry and parched state; breathing be short and interrupted; the pulse become progressively quicker, and the excretions begin to emit a putrid, cadaverous stench, the worst consequences are then to be feared. It is also a dangerous sign, when the different symptoms bear no proportion to each other; for instance, if, notwithstanding a dry mouth and tongue, the patient be not thirsty; if he evince a dislike to *acids* in a putrid fever, and his pulse be feeble during great heat and an increased circulation of the blood.

For the treatment and cure of fever, in general, it is impossible to lay down any precepts which are applicable to every individual; we shall, therefore, confine our observations to the following points:

1. The nature of the fever ought to be ascertained by professional men, who will accordingly endeavour to remove, if possible, the proximate cause. Thus, where bilious impurities abound, they are often most effectually evacuated by emetics; where a plethora or fulness of blood prevails in the constitution, bleeding is occasionally useful; where the humours appear to be in an acrid state, it will be necessary to take diluent liquors, such as ptisan, gruel, &c, a tea cupful every half hour, and to abstain from all solid food, eggs, and even broth.

2. To promote the *crisis*, or assist the efforts of Nature by all proper means: thus, if the pulse become softer and fuller, diaphoretic or sweating remedies will then be necessary; but nothing ought to be more guarded against in fevers, than a precipitate and excessive use of *medicines*. This caution is so well founded, that the ancients cured the most obstinate and malignant fevers almost entirely by a strict attention to diet and regimen. Hence, the air in the patient's room ought to be pure, and never to exceed 70°. of FAHRENHEIT; during the cold fit, additional covering may be allowed, but which should be instantly removed, as well as all feather-beds, when heat and perspiration commence. Both food and drink must be of a cooling and diluting nature; the latter, in particular, should be plentifully given, without overloading the stomach. All subacid, *ripe* fruit, particularly cherries, raspberries, strawberries, &c. are therefore of singular benefit in all

inflammatory and putrid fevers; apples, pears, and plums being less juicy, are inferior to the fruit before mentioned, though some kinds of mellow and saccharine pears are equally proper. The juice of lemons and oranges, mixed with water, also affords a cooling and salutary beverage. In short, all those rules which we have stated under the head of CHRONICAL DISEASES, vol. i. p. 522, and foll. are, with a few modifications, also applicable in febrile complaints, especially after the *crisis* has taken place, when the patient may be considered in a state of convalescence. Although fevers are divided, by authors, into inflammatory, putrid, bilious, pituitous, hectic, and consumptive, eruptive, sporadic, epidemic, infectious, endemic, topical, vernal, autumnal, complicated, original and symptomatic, regular and irregular; yet the following division is better calculated to answer *practical* purposes.

I. *Intermittents*, or AGUES, which see.

II. *Inflammatory fevers*, or those which are attended with an inflammation of any internal part of the body; such as the breast, lungs, throat, &c. or of some external part, for instance, the ROSE. For a description of the former kind, see PLEURISY, and INFLAMMATION.—Sometimes, however, there is no local affection discoverable, though all the symptoms of an inflammatory disposition of the blood are evident, in which case the disorder is termed a simple inflammatory fever.

III. *Putrid fevers*, which are accompanied with certain symptoms of putridity, either in the first passages, or in the mass of the blood, or in both.—These malignant fevers are highly infectious and destructive; though they have lately been most successfully treated by large doses of *fresh* YEAST, diluted with water; a cheap and easy remedy, of which we propose to give a farther account, under its alphabetical head.

IV. *Bilious fevers*, are thus denominated from an undue secretion of the BILE, to which article we refer:—no time should be lost here in applying for proper advice, as they frequently terminate in putrid fevers, if mismanaged in the beginning.—See also YELLOW Fever.

V. *Nervous fevers*, in which the whole nervous system is originally affected: these maladies are chiefly of modern origin, and have frequently been relieved by the proper use of the *tepid bath*. We cannot in this place expatiate upon their treatment, as they appear in a thousand different forms, and require the assistance of professional men, more than any other class of diseases.

VI. *Hectic fevers* are those which emaciate the body, and arise in consequence of the corruption of any particular organ or viscus in the system; for instance, obstruction, suppuration, or ulceration of the breast, lungs, liver, &c. See HECTIC.—These fevers, however, are to be distinguished from the slow, consumptive, and cachectic febrile affections, which are followed by a general decline of the constitution, though there appears to be no organic injury, or local disorder, in any part of the system.

VII. *Eruptive fevers* are termed those, in which the skin or surface of the body discovers an eruption which consists either in vesicles, and pustules, such as the small-pox, scarlet fever, &c. or in spots somewhat elevated above the skin, and uneven to the touch, such as the measles; or in mere stains or spots, marked only by a discoloured surface; for example, in the petechial fever.

It would be superfluous to give farther explanations on the different kinds of fever, a subject which is but imperfectly understood in theory, though the generality of these maladies has, in consequence of many important discoveries in chemistry, been lately treated with greater success than our medical predecessors were entitled to expect, from their deficient knowledge of natural philosophy. Thus, an attempt has been made to reduce *all fevers* to *one* generic source, and to ascribe their origin to an undue proportion of *azote*, and a deficiency of *oxygen*, in the human system. Although we cannot approve of that uncommon fondness for *generalization*, which has been productive of incalculable mischief in medical practice, yet there appears to be some foundation for those eccentric opinions maintained by a foreign professor, Dr. Reich, of Erlang, in a treatise "*On Fever*;" a translation of which has just been published in English. This ingenious practitioner has cured the most malignant putrid fevers, by the liberal use of mineral acids, and particularly the *muriatic*, or spirit of sea-salt. He acknowledges that acids have long been employed in fevers, though only in very small quantities, and chiefly as auxiliaries, especially the vitriolic, and those of the vegetable kind; but the muriatic acid has seldom been used. In the year 1773, indeed, Sir W. Fordyce highly recommended this acid to be given internally, in putrid and malignant fevers, and to be applied externally in the form of a liniment, or gargle, to the sloughs in the throat, frequently accompanying such fevers; but his liniment consisted only of twenty drops of the concentrated acid to one ounce of honey of roses; and his *antiseptic febrifuge* contained five drops of the acid mixed with two ounces of a strong decoction of Peruvian bark. In a subsequent pamphlet, concerning the virtues of the muriatic acid, which appeared in 1790, Sir William recommends it as the best remedy in all putrid diseases of the worst kind; in petechial, camp, and jail-distempers, as well as the malignant sore-throat, so frequently fatal in this country; and afterwards in the small-pox and plague. The original discovery of this invaluable medicine appears to belong to Constantine Rhodocanacides, who in 1664 published a treatise on the internal and external use of this acid, the extraordinary power of which he derived from the universality and approved value of common salt. Hence he recommended it to be mixed with food and drink to the amount, if necessary, of 100 drops in 24 hours, both as a preventive and remedy for the plague, and as a general antiseptic.

Dr. Reich observes, that the quantity of acids necessary to effect a cure of fevers, depends on circumstances, and can only be determined by experience. It is, however, more advisable to begin with small doses, and to repeat them frequently; for instance, if a mixture be made of from one dram to half an ounce of the acid, eight ounces of water, and two of syrup, let the patient take a tablespoonful or more every hour, or two hours. But, in time of danger, from forty to an hundred drops, properly diluted, may be given at once, and such doses often repeated.—As we propose to insert a few additional remarks on the use and efficacy of this acid, under the head of TYPHUS, we shall conclude with observing, that we have prescribed large doses of this powerful remedy only in two cases of complicated bilious and nervous fevers, in which it at first produced alarming symptoms, such as diarrhœa, vomiting, &c. though it was eventually attended with success. In short, it is one of those medicines which may be safely administered by the experienced hand of the practitioner, but which is apt to be misapplied by dabblers and empirics.

FEVER *in horses*, a disorder to which these creatures are subject from various causes. The symptoms are: great restlessness; the animal's flanks beat; his eyes are red and inflamed; his breath is hot, and smells strong; his appetite is lost; he dungs little, but frequently; his urine is of a very high colour, is discharged seldom, and with great difficulty; he appears to be thirsty, yet drinks little, though frequently; and his pulse is uncommonly high.

The first remedy to be applied is bleeding, when two or three quarts of blood may be taken from the animal, if it be large, strong, and in good condition. A pint of the following drink is then to be given four times in the course of the day: Take of baum, sage, and chamomile flowers, each a handful; of sliced liquorice-root ½ an ounce, nitre, 3 ounces: the whole is to be infused in 2 quarts of boiling water, and, as soon as it is cold, it is to be strained, the juice of 2 or three lemons squeezed in, and sweetened with honey; or, instead of the infusion above directed, an ounce of nitre, mixed with honey, may be given in the form of a ball, three times a day, and washed down with any small liquor.

The animal's diet ought to consist of scalded bran, allowed in small quantities; or, if he refuse this, a little dry bran sprinkled with water may be substituted. It will also be necessary to put some picked hay into the rack, as horses will frequently eat it, when they relish no other food: their water should be scarcely lukewarm, and given them frequently, but in small quantities. Their clothing ought to be moderate, for too much weight on a horse is highly improper in fevers.

If, in the course of two days after this treatment, the animal's appetite begin to return, and he eat a little bran or hay, careful nursing will be sufficient to complete the cure; but, if he continue to loathe his food, it will be necessary to take away more blood, and to repeat the drenches.—The following clyster, consisting of 2 quarts of water gruel, fat broth, pot-liquor, a handful of common salt, 4 ounces of treacle, and a pint of linseed-oil, should be administered every day, while his excrements continue dry or knotty. Such clysters are more proper than those consisting of marsh-mallows, chamomile flowers, fennel-seed, and other purging ingredients.

An opening drink prepared of 4 ounces of Glauber's salts, or cream of tartar, and an equal quantity of lenitive electuary, dissolved in barley-water, or any other liquor, should likewise be given every second day, when the clysters may be omitted; the nitre-balls, or the drink above mentioned, being continued every day as usual, unless the clysters be administered. In the course of four or five days, the horse will begin to pick his food, if he be not beyond the power of medicine; and, though his flanks will continue to heave for a fortnight, yet this may be effectually removed by walking him in the fresh air, and allowing him plenty of clean litter in the stable.

FEVERFEW, or *Matricaria*, L. a genus of plants consisting of six species, three of which are indigenous. The principal of these are:

1. The *parthenium*, or Common Feverfew, which grows in waste grounds, hedges, and walls, and flowers in June or July. This plant is refused by horses; the whole has a strong, disagreeable smell, a bitter taste, and yields an essential oil by distillation.—It was formerly celebrated for its efficacy in hysteric, and other affections of the nerves; as well as for its tonic, stomachic, and resolvent properties. Dr. LEWIS, however, thinks it much inferior to chamomile, with which it agrees in all its sensible qualities, excepting that the common feverfew is much weaker. But its odour, taste, and other constituents, prove that it is a medicine of considerable activity.—In Germany, it has been usefully employed in tanning and currying leather.

2. The *chamomilla*, or Chamomile Feverfew, which grows in corn-fields, dung-hills, as well as on road-sides, and is in flower from May to August. Its properties are similar to those of the common chamomile: it is eaten by cows, goats, and sheep, but not relished by horses; and hogs totally refuse it.—According to PÖRNER, the flowers of this species of feverfew afford a fine yellow pigment, which may be rendered more permanent by the addition of alum, cream of tartar, and gypsum.—SCHEFFER, another German chemist, informs us, that a decoction of these flowers imparts a beautiful yellow colour to silk, if a solution of tin, saturated with cream of tartar, be gradually dropped into the liquor, till it acquires a deep yellow tinge. BERTHOLLET, however, on this occasion remarks, that *pure* water must be employed, which does not precipitate the solution of tin, and that the *dyeing bath* should be kept in a hot, though not boiling state.

FEVER-POWDERS are generally understood to be those originally prepared by the late Dr. ROBERT JAMES, and by many still believed to be a certain remedy for fevers of every description. According to the recipe deposited in the records of Chancery (when Dr. JAMES took out a patent for the sale of his powders), they consist of *antimony* calcined with a continued protracted heat, in a flat, unglazed earthen vessel, adding to it from time to time a sufficient quantity of any animal oil and salt, well dephlegmated; then boiling it in melted nitre for a considerable time, and separating the powder from the nitre, by dissolving it in water.—The chief intention in this process, is to divest the antimony of its sulphur, by mixing it with some animal substance, to prevent its running into glass during the calcination.

When this once celebrated empirie first administered those powders, he usually added a small proportion of the red precipitate of mercury to each dose; but he soon relinquished this practice, after observing that some patients were salivated by the use of his nostrum. Hence we find that he has conscientiously annexed the following clause at the end of his specification given into Chancery: "The dose of this medicine is *uncertain*; but, in general, thirty grains of the antimonial, and one grain of the mercurial, is a moderate dose." Signed and sworn to by ROBERT JAMES.

It is to be lamented that *regular* practitioners have sometimes deviated from the more rational path of medical science, and degraded themselves by following the numerous herd of quacks: nay, it is still more surprizing, that even intelligent physicians have often humoured their prejudiced patients, by *prescribing* those fever powders, of which the inventor himself had but an indifferent opinion. For it is a well-attested fact, that the *Peruvian bark*, and not the antimonial powder, was the remedy to which the late Dr. JAMES generally trusted in the cure of fevers. He gave his powders only to clear the stomach and bowels; after effecting that purpose, he poured in the bark as freely as the patient was able to swallow it; for he has repeatedly declared to Dr. MONRO (see his *Medical and Pharmaceutical Chemistry*, vol. i. p. 366, and foll.), that if there was a possibility of curing a fever, the bark was the remedy to be relied upon; and, if the disease did not yield to the latter, he was convinced that it could not be removed by any other medicine.—However empirical this declaration must appear to every professional man possessing a moderate share of medical knowledge, yet it is amply sufficient to evince the fallacy of Dr. JAMES's Fever-powders, which, from the nature of their ingredients, are so violent in their operation, that we trust no prudent person will in future purchase, or use, them without submitting his case to the discretion of an *unbiassed* and competent judge.

FIELD, in agriculture, a piece of land inclosed, either for the purpose of tillage, or for pasture.

The best season for laying land down to grass, is the latter end of August, or the beginning of September, when the roots of the young plants will have time to strike deeply, before the frost sets in. Moist weather is the most proper for this purpose, as the earth will then be sufficiently warm, and the seeds quickly vegetate: but, if that season prove unfavourable, they may be sown in the middle of the month of March following.

In order to obtain a fine pasture, the soil should be thoroughly cleared from all noxious weeds, by repeated ploughing; for, if any of them are suffered to remain, they will speedily outgrow, and destroy the young grass. These weeds ought next to be raked up into heaps, burnt on the land, and their ashes spread as a manure; but, if the soil be clayey, and wet, it will be necessary to make some drains to carry off the water; which, if suffered to stagnate, will both chill and sour the grass. Previously to sowing, the land ought to be laid as level and as fine as possible: thus, if the grass-seeds be clean, three bushels will be sufficient for an acre. After sowing,

ing, they should be gently harrowed, and smoothened over with a wooden roller. When the grass comes up, all the vacant spots are to be provided with fresh seed; which, if it be properly rolled in, will in a short time attain the height of that first sown.

Few circumstances are of greater importance in rural economy, especially to graziers, than to ascertain the most valuable field for pasture. For this purpose, Mr. DAVID YOUNG ("*Agriculture the primary Interest of Britain,*" 8vo. 1788, 6s.) proposes to weigh all cattle previously to their going into each field, and to allow them neither food nor water, for 12 hours before. After the whole pasture is consumed, they should stand for a similar length of time, without food and drink, and then again be weighed. Thus, the increase of weight in each animal, may be easily determined.

Fields ought not to be kept too long in pasture. When land is first laid down, with a view to ameliorate the soil, the common practice is to leave it in that state for many years: for it is the general opinion, that the longer it is thus suffered to lie, the richer it will become for bearing corn. But, though the truth of this position be evident, the most important object of inquiry is, to ascertain the most beneficial *rotation of crops.* (See CROP.)—The best criterion, perhaps, is to take up pasture for corn, as soon as the grass begins to be deficient both in quantity and quality; and, after a few crops, to lay it down again with grass-seeds: by this method the land may be kept in *good heart,* and considerable expence saved, while in the end, the soil will produce larger crops, and consequently afford greater profit.

FIG-TREE, or *Ficus,* L. a genus of plants, comprising forty-three species, of which one only is cultivated in this country, namely, the *carica,* or common fig-tree. It is propagated either by suckers arising from the roots; by layers; or by cuttings. The first are to be taken off as low down as possible; all ragged and superfluous parts being removed, and the tops left entire, especially if intended for standards. These are to be planted in nursery-rows, two or three inches apart; or, they may be set in the spot where they are intended to remain. They are then suffered to branch out and form a head, care being taken that the branches never be shortened: for, as the figs are always produced on the upper part of the young shoots, if these be cut off, no fruit can be expected.

The best season for raising fig-trees by *layers,* is in autumn; the young pliable lower shoots are first to be selected from the moist fruitful branches, which are to be *laid* in the usual way; the body of the layers being covered with soil to the depth of three or four inches, and the top kept as upright and entire as possible. In the succeeding autumn, they will be fit to be separated from the parent-stock, when they may be planted either in the nursery, or in the place of their ultimate destination.

The time for propagating by *cuttings,* is either in autumn, or at any time during the month of March. The shoots to be selected for this purpose, ought to be those of the preceding summer; short, and strong; from 12 to 15 inches in length; and to have at least an inch of the two years wood at their base; the tops being left entire. These cuttings are to be set 6 or 8 inches deep, in a bed of good soil, in rows 2 feet apart; and, if they be planted in autumn, it will be requisite to protect the tops from the severity of the winter, with any kind of loose, long litter.

Fig-trees require a free exposure to the rays of the sun, at the side of an espalier: they ought to be frequently watered; and, according to **Bechstein**, wood-ashes are for them a more proper manure than dung. Towards the winter of our colder climate, the root of the fig-tree ought to be somewhat loosened, and the trunk bent down in the form of a bow, and covered with straw, to protect it from the severity of the frost.

There is a mode of increasing and ripening the fruit of the domestic fig-tree, by means of insects: it is practised in the Levant, and known by the name of *caprification*. The principal of those insects appears to be the *cynips psenes* that deposits its eggs in the figs; from these arise small worms which, when covered with the *pollen* or flower-dust, migrate from the male flowers, take shelter in the female ones, and thus effect fructification. In consequence of this natural process, the figs not only ripen more speedily, but also become much larger; so that a fig-tree which formerly produced about 25 lb. of ripe fruit, now yields nearly 300 lb.—Later experience has proved that *caprification* may be successfully imitated in gardens, by wounding the buds of the figs with a straw or feather dipped in sweet oil.—**Bechstein** advises a drop of olive oil to be introduced into the calyx of the figs when half ripe, and to repeat this unction every four or five days; as it will remarkably promote the growth and maturing of the fruit.—Plums and pears also, when wounded by insects, have been observed to ripen at a more early period, and the pulp about the wounded part to acquire a more delicious flavour.

The principal varieties of the common fig are, the brown, or chesnut coloured Ischia fig; the murrey, or brown Naples fig; the common blue or purple fig; and lastly, the Turkey fig, which is in the greatest estimation, and is imported in considerable quantities into this country.

Figs contain a large portion of mucilage, and a small quantity of oil. They are grateful to the stomach, and more easy of digestion than any other sweet fruit; they abound with saccharine matter, and are very nutritious, though they are apt to occasion flatulency, when eaten without bread, or other mealy substances.—A decoction of figs affords excellent gargles to cleanse the throat and mouth: this fruit also forms an ingredient in lenitive electuaries, and pectoral draughts; it is likewise applied externally to soften, digest, and promote maturation. When in an unripe state, figs, as well as the whole tree, yield an acrid, milky liquor, which, if taken as a medicine, proves both purgative and emetic; but externally affords a mild caustic: hence it is frequently employed for the removal of warts. This juice has also been substituted for *sympathetic ink*; as the characters written with it, do not appear visible till they are exposed to a fire.

In dyeing, a decoction of the

green branches and leaves of the fig-tree imparts, according to SUCKOW and DAMBOURNEY, a deep gold colour, of a brown-reddish shade. The latter observes, that the young branches communicated a delicate brown, to cloth prepared with a solution of bismuth; but the leaves alone yielded a very deep yellow colour. It is remarkable, that the substances dyed with any part of the fig-tree, retained a very agreeable fragrance, resembling that of the tuberose, even after being washed and kept for five months. Hence they might be usefully employed as ingredients in other dyeing drugs, which possess a less agreeable, and sometimes offensive, smell.—The wood of the fig-tree is almost indestructible, and was formerly much employed in the East, for the preservation of embalmed bodies.

FIGWORT, or *Scrophularia*, L. a genus of plants consisting of twenty-one species, four of which are natives of Britain: the principal of these is the *nodosa*, or great figwort, which is perennial, grows in woods and moist hedges, and flowers in the month of July. It is eaten by goats, but refused by horses, cows, sheep, and swine. The animals last mentioned, when diseased with the scab, may be cured by washing them in a decoction of these leaves. BECHSTEIN remarks, that the fibrous root, when overgrown with small knobs, is said to afford a good remedy for the worms in hogs.

FILBERDS. See HASELNUT-TREE.

FILE, a tool employed by smiths and others, for the purpose of smoothing, polishing, or cutting metals.

This instrument is composed either of iron or forged steel, cut by means of a chisel and mallet, in small furrows of various depths, and in different directions, according to the grain or touch required. After being thus cut, it is tempered with a very hard and dry soot, which is diluted and worked up with urine, vinegar, and salt, to the consistence of mustard. The process of tempering consists in rubbing the files over with this preparation, covering them with loam, and then placing them in a charcoal fire, whence they are removed as soon as they become red-hot. Immediately after being taken out, they are immersed into cold spring water; and, when cold, cleaned with charcoal and a rag; after which operation, they are laid up in bran, to prevent them from becoming rusty.

Files are of different forms, sizes, cuts, and degrees of fineness, in proportion to the various uses and occasions for which they are designed; such are the common square, flat, triangular, or round files; the *rough-toothed* files, which are intended to cut more speedily than any other; and the *fine-toothed* file, which cuts more slowly, and is appropriated to finer workmanship.—The best and most durable instruments of this description are manufactured at Sheffield.

FILTRATION, in chemistry, as well as in domestic economy, is the process of straining or filtering liquors by means of woollen cloth, cotton, linen, paper, or other materials.—It deserves to be previously remarked, that in every attempt at purifying fluids in the manner here alluded to, we can divest them only of those foreign ingredients which are *mixed* with them, and not of such as they hold in *solution*. The former may be separated from them, by proper filtration; but the latter must be disengaged, either by precipitation or distillation. Although the utility of filtration is thus limited to the noxious particles *mixed* with liquid bodies, such as foul water, yet it is sufficiently important to deserve some attention.

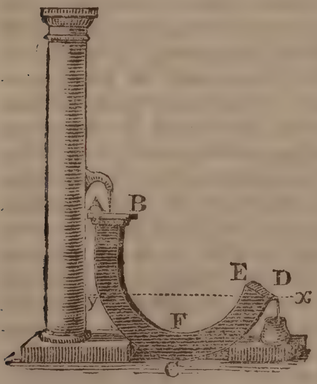
The common filters are of two sorts; namely, simple pieces of paper, or cloth, through which the fluid is passed; or similar materials twisted up in the same manner as skeins or wicks; they are first wetted, then squeezed, and one end put into the vessel, which contains the liquor to be filtrated; the other end is to be suspended beneath the surface of the liquor, the purest parts of which drop gradually out of the vessel, leaving behind the coarser particles.

These filters, however, are not calculated for domestic use: hence different machines have been invented for the purpose of purifying turbid water. But among these various contrivances, few appear to possess the advantage of simplicity, combined with that of affording an ample supply of a fluid so essentially necessary to the preservation of health.—A patent has lately been granted to Mr. JAMES PEACOCK, of Finsbury-square, for a filtering machine, which is stated to be superior to any hitherto invented. It completely accomplishes the purpose of filtration, by causing the turbid fluid to ascend through a medium of fine gravel, of progressive degrees of fineness, by which means the foulest water or other fluid becomes perfectly freed from all (mixed) impurities, without any noxious mineral quality, which pumice or other common filtering stones are suspected to communicate. Should, from continual use, its operation become in any degree impeded, it may be completely cleansed with the greatest facility in the short space of one minute; an advantage possessed by none of the common machines that operate by *descent*. Beside these useful properties, Mr. PEACOCK's filtering machine does not occupy more room than a large drip-stone with its apparatus, and yields a constant and pure stream of more than 300 gallons in 24 hours.—A specimen of this machine is deposited for inspection at Guildhall, London.

As we are, from a principle of justice to the public, no advocates for *patent inventions* that upon the whole, arise from the same mercenary and contracted source as *patent quack medicines*; we shall recommend a very simple and effectual apparatus, by which the purest water may be easily procured. This contrivance is calculated on the plan of the celebrated filtering machine erected at Paris, in the vicinity of the *Samarataine*, and by means of which the foul water of the river Seine is so completely purified, as to be divested of its laxative properties. Besides, this machinery, if constructed on a large scale, is well adapted to supply the largest breweries, or dyeing works, with any quantity of *pure* water at a trifling expence, and is attended with very little additional trouble.

When we reflect on the method which Nature pursues in the filtration of water, we find that such waters as descend from hills, tho' passing through sand and rocks, are seldom perfectly pure; but that those are the most limpid, which, by ascending, ooze out near the foot of a mountain. The cause of this difference appears to be owing to the circumstance, that if the water only *descends* through sand, the finest and most weighty foreign particles gradually penetrate through the sandy strata; on the contrary, when it is forced to *rise* through sand, all such ponderous ingredients settle at the bottom; because, from their greater specific gravity, they cannot ascend to the top. The lighter particles of fluids, consequently, in both cases remain in the upper strata of the earth or sand.

From these considerations, Professor Parrot, jun. of Paris, was induced to give his filtering machine the form represented in the following cut:



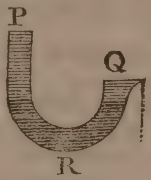
The principal part of the machinery consists of a square vessel, bent in the form of an inverted syphon. The curve may be circular, elliptic, or in any other direction. This vessel is filled with fine, pure sand, till nearly the height of the dotted line x, y, which denotes the ascent of the water to D, whence it flows into the receiver. The part marked A, B, should always project above this line, according to the size of the filtering machine. To A, B, there is attached a woollen bag, which is open at the top, and the lower part of which touches the sand. It serves the purpose of collecting the coarsest impurities, and thus preserves the sand for a longer time from becoming foul. The bag, therefore, may occasionally be removed, and rinsed in clean water.—It is evident, that the water flows at A, through the bag into the filtre, and rises at the place marked D, which is considerably lower than the former. It affords a very agreeable sight to observe the most limpid fluid penetrating the uppermost stratum of sand, perfectly similar to that oozing from the purest natural spring.

Prof. Parrot remarks that he procured a filtering machine made of block-tin, for ascertaining by experiments the purity and quality of water, that may thus be obtained in a given time. It consisted of the following dimensions: the small diameter B,E, was eight Paris inches; the large of the whole machine, eleven inches; consequently the thickness of the vessel A, B, was one inch and a half;—the breadth of it, two inches and seven-eighths. The perpendicular height of the lower side, from C, its basis, to the rim D, whence the water issues, was four inches and one-twelfth—the opposite height of the mouth A,B, eight inches and three-fourths; and the height of the sand on the side marked D, was three inches and one-sixth.

Although, in experiments of this nature, much depends on the relative size and purity of the sand, which necessarily afford different results, yet Prof. Parrot has, after repeated trials, deduced the following conclusions, which appear to be well-founded.

1. That the difference of the *niveau*, or water-level, has an essential influence on the quantity of the purified water thus obtained; 2. That a prolongation of the stratum of sand does not considerably diminish the product of the filtre, but remarkably contributes to the purity of the fluid. 3. That if the water be forced to pass through the sand with increased velocity, it will be less pure than by allowing it a proper time for its passage; and, 4. That a machine of the dimensions above described, will furnish about three quarts of water in an hour, or eighteen gallons in twenty-four hours. This quantity, however, being too large in proportion to the size of the machine, it is advisable, either to lessen the difference of the water-fall; or, which is still better, to prolong the stratum of sand, in order to reduce the filtration of the water to half the quantity above stated, and to obtain it in greater purity. Thus, a filtering apparatus eighteen inches long from A to D, two inches thick, and four broad, would afford every hour six pints of very pure water. If, therefore, so small a machine, containing a very moderate stratum of sand, and requiring only a difference of two or three inches in the height of the water, furnishes a clear and pure fluid, it follows that an apparatus on a larger scale, provided with a bed of sand from five to six feet long, and admitting of a difference from twelve to eighteen inches in the fall of the water, might be usefully employed in public wells, hydraulic machines, and even in camps, for the supply of an army.

In the construction of large filtering machines, Prof. PARROT justly observes, that they should not be extended in the direction A, C, D, to a greater length than is absolutely necessary; as, in this case, they will not require any considerable difference in the fall and rise of the water: on the other hand, their breadth and thickness may be accordingly increased.—Thus, the diameter of such a machine would still more resemble that of a syphon, as is represented in the annexed cut.



This form might also be adopted for smaller machines, especially such as are designed for *travellers,* two of whom might be amply provided with pure water, and in a very short time, by a vessel of the following dimensions: from P, to Q, eight inches long; from P, to R, twelve inches high; and the whole four inches in breadth.

If the form last delineated be employed on an extensive scale, there should be a trap door in the lowermost part marked R, so constructed that it may fit exactly, and admit no passage to the water: this aperture would serve only for the removal of the sand, when it is rendered foul by long use. In the smaller machines, intended for travelling, such a door is unnecessary, as they may be easily emptied of their contents through either of the orifices P, or Q. Instead of this addition to the latter, the upper room (which in the first of these cuts is circumscribed with the letters B, F, E), might

E), might serve as a reservoir of pure water, that could either be decanted, or drawn off by means of a cock applied to the centre of the machine, marked F. We think, however, this latter arrangement, which is proposed by M. Parrot, in many respects objectionable, and therefore advise the reader to make use of the more simplified construction. Hence we shall only add, that every filtering machine ought to be provided with a cloth cover, to prevent the dust from rising with the water, without impeding its filtration.

It is needless to expatiate on the great advantages of filtering machines in the different processes of dyeing, baking, brewing, distilling, and all the domestic arts. As no particle of real nutriment can be assimilated to the human fluids, without being previously macerated and reduced by *water* (whether this fluid be introduced into the stomach, in the form of beer, wine, spirits, tea, &c.) it will be easily understood that *impure* water cannot fail to produce, however slowly, many dangerous, and often incurable diseases—the source of which is seldom suspected.—See Water.

FINCH, or *Fringilla*, L. a genus of birds, comprising one hundred and eight species, of which ten only are natives of this country; the principal of these are mentioned in their alphabetical order.—See Canary-bird, Goldfinch, Linnet, Sparrow, &c.

Fining: See Clarification.

FIR-TREE, the name of several species of the *Pinus*, or pine-tree, of which the following are the principal:

1. The *sylvestris*, or Scotch fir, which is a native of Scotland, and flourishes best in a poor sandy soil, especially if it be mixed with loam: on rocks or bogs it seldom attains a large size; if planted in a black soil, it becomes diseased; and, on chalk-lands, it perishes.

This species of fir thrives most luxuriantly on the north and east sides of hills, where it not only grows more rapidly, and attains a greater height, but the grain of its wood is also more compact, and the trees are fuller of sap than if they had been planted in another direction.

The Scotch fir is propagated from seeds, which are obtained from the cones or fruit it produces. The proper time of sowing is in the latter end of March, or beginning of April: if the seeds be set in a grove, the tree becomes tall and naked; if in open situations, exposed to the sun, it becomes branched. At the age of four years, it is to be transplanted to the place where it is intended to remain; during which operation the utmost caution should be taken, that the central or tap-root be not broken off, or in any manner impeded in its growth; as, in that case, the stem would cease to shoot upwards, and the tree remain a dwarf. But, notwithstanding every care taken by the industrious planter, his hopes are often frustrated by predatory animals, such as squirrels, that strip the whole bark off the young tree, in consequence of which it dies, and is broken by the first high wind. The hare is another enemy to young firs, though less dangerous: it is affirmed that hares may be drawn away from them, by sowing in their vicinity the *Cytisus Laburnum*, a species of the Bane-trefoil, the young shoots of which they prefer to firs.

This species of the fir, is one of the most useful plants in the whole vegetable creation: it furnishes us with the best red or yellow deal, which is employed in the making of masts, floors, wainscots, tables, boxes, and for numberless other purposes.—The trunk and branch of this species, in common with the rest of the pine-tribe, afford excellent pitch and tar.—The tops, or young tender shoots, are an useful substitute for fodder, especially during the winter season: see vol. i. p. 460.—The roots, when divided into small splinters, are employed by the poor as a substitute for candles.—The outer bark is of considerable use in tanning leather; the inner rind is, by the inhabitants of Loch-Broom, in the county of Ross, converted into ropes. In the more northern parts of Europe, it is, in times of scarcity, made into bread: for this purpose, the inhabitants select a tree, the trunk of which is smooth, and contains the least portion of resin: they strip off the bark in the spring, dry it gently, then reduce it to powder, and knead it with a small quantity of corn-meal and water, in which state it is baked into bread.—The young cones, when distilled, afford an essential diuretic oil, somewhat resembling that of turpentine: a resinous extract is likewise prepared from them, and believed to possess virtues similar to those of the balsam of Peru.—An infusion of the buds is highly recommended as an antiscorbutic.

2. The *Abies*, or Spruce-fir, which is a native of the northern parts of Europe, whence it has been introduced into this country. It is propagated in the same manner as the Scotch-fir, and delights in a dry, gravelly situation, though it will thrive in almost every soil. It also succeeds on a loam, and even on a hard dry rock; but frequently decays at the end of 18 or 20 years, if planted on a stiff, wet clay. The same precautions as are to be observed in transplanting the Scotch fir, ought to be more carefully attended to with respect to the Spruce fir, which should be set exactly in the same direction in which it stood before; as, by turning the bark to another quarter of the compass, the tree generally perishes.

There are two varieties of this species, namely, the white and black spruce; the wood of both is very light, and decays when exposed to the air for a considerable length of time: it is chiefly employed for packing-cases, musical instruments, and the like. Its branches form the principal ingredient in preparing the essence of spruce, from which spruce-beer is brewed. A fine clear *turpentine* oozes from these trees: the Indians of North-America are said to employ it in curing green wounds, as well as certain internal disorders: the resin which distils from the White Spruce-fir, in particular, is supposed to be a sovereign remedy in fevers, and in pains of the breast and stomach. In Britain, this resinous juice is boiled in water, and strained through a linen cloth, by which process it acquires a solid consistence, a reddish brown colour, and an odour by no means disagreeable—whence it is called *Burgundy pitch.* In obstinate coughs, affections of the lungs, and other internal complaints, plasters of this resin, by acting as a topical stimulus, are frequently found of considerable service.

3. The *picea*, or Yew-leaved Fir; which is a tall ever-green,

and a native of Scotland, Sweden, and Germany. This species also produces two varieties, viz. the *Silver Fir*, and the *Balm of Gilead Fir*. The former grows to a great height (in Germany sometimes rising to 180 feet), and has received that name from the white appearance of its leaves. It is very hardy, and will thrive in any situation; but prospers remarkably in a rich, loamy soil. The balm of gilead fir is eminently calculated for ornamental gardening, on account of the beauty of its form, and the fragrance of its foliage. It ought to be planted in a rich, good earth, as it grows best in a deep, black, sandy mould, where its roots have sufficient room to strike freely. From this variety exudes the resinous juice, erroneously called *Balm of Gilead*, on account of its possessing the same properties as that which is produced from the *Pinus balsamea*, or Hemlock-fir, a native of Virginia and Canada, but seldom cultivated in England. In common with the other turpentines obtained from the pine tribe, that of the balm of gilead fir is a hot, stimulating, and detergent medicine: small doses of it have sometimes been successfully used in chronic rheumatisms and palsy.

The different species of fir are infested by a variety of insects: the most formidable of these is a brown grub, about 4-10ths of an inch in length, which changes into a brownish moth, resembling those producing the grubs which infest apple and pear trees. These moths deposit their eggs in the heads or tops of the firs, where they are hatched in the month of May, when the young grubs eat their way into the leading branches, and consume the pith in their course. They continue their depredations till the beginning of June, when they assume the form of chrysalis, and lie in a torpid state till Midsummer, at which period they become perfect moths. As these insects multiply most rapidly, the greatest caution is necessary in planting firs, that they may not be propagated from an infected nursery; in which case it will be extremely difficult to extirpate the vermin. The only effectual method of destroying them is, to lop off, in the month of May, the branches thus infested; for after the trees have attained a height exceeding ten or fifteen feet, there is no remedy.

FIRE, is that subtle, invisible cause, which penetrates both solid and liquid matters with extreme facility, and renders them hot to the touch. It is also the chief agent, by which the composition and decomposition of natural bodies is generally effected; so that, without fire, the animal and vegetable kingdoms would cease to exist.

Various opinions have been maintained concerning the nature and properties of fire; for an account of which we are obliged to refer the reader to the works of BOYLE, NEWTON, and SCHEELE; as we propose to give a few illustrations connected with this subject, under the article HEAT.

Though designed to be subservient to the most useful purposes, fire frequently becomes a scourge to mankind; and, unless it be timely discovered, lays whole streets and towns in ashes. Hence the securing of houses and other buildings against this devouring element, has ever formed an important object of inquiry, while it has exercised the ingenuity of intelligent men: we shall briefly state a few of the most remarkable experiments, together with the result or success which has attended them.

Dr. HALES first proposed a plan of covering the floors of houses with earth. The thicker the mould is laid on the floors, the greater is the security. He supposes that the depth of an inch will be amply sufficient; though he recommends to lay a deeper coat on the stairs; because fire, in general, ascends by means of stair-cases with the greatest velocity.

A patent was granted in April 1773, to DAVID HARTLEY, Esq. of Golden-square, for his method of securing buildings and ships against fire. See our first vol. p. 385.

Lord MAHON has likewise invented a very simple and effectual mode of securing every kind of building against all danger of fire: he divides it into three parts, namely, *under-flooring*, *extra-lathing*, and *inter-securing*. The first part or method, is either single or double. In *single under-flooring*, a common strong lath, one quarter of an inch thick, should be nailed against each side of every joist and main-timber, supporting the floor which is to be secured. Similar laths are then to be nailed on the whole length of the joists, the ends of which abut against each other. The top of each lath or fillet, ought to be an inch and a half below the top of the joists or timbers, against which they are nailed, so as to form a small ledge on every side. When these fillets are nailed on, they should be laid in a rough plaster, which ought to be spread on the tops of such fillets, so as to leave no vacant space between them and the joists. Short pieces of common laths are next to be nailed closely together, in a direction contrary to that of the joists; the ends of the former are to rest on the fillets, and to be well bedded in rough plaster, but not fastened with nails. They are next to be coated once with the plaster, which is to be spread over them to the tops of the joists. In *double-flooring*, the fillets and short pieces of laths are applied in the manner already described; the coat of rough plaster ought, however, in this method, to be somewhat more than half as thick as that in single-flooring.—While the rough plaster is laying on, some additional short pieces of laths are to be inserted between the joists upon the first coat, as closely to each other as possible, and in the same direction as the first layer of laths. Over this second layer of short laths, another coat of rough plaster should be spread, which ought to be trowelled level with the tops of the joists.

As soon as the plaster-work between the joists is perfectly dry, it should be inspected, in order to ascertain whether there be any small cracks, especially next to the joists. Should any occur, it will be requisite to close them, by washing them over with a brush, wetted with mortar-wash, which may be prepared by mixing two measures of quick-lime and one of sand in a pail, and tempering the whole with water, till it acquires the consistence of a thin jelly.

Previously to laying down the flooring-boards, a small quantity of dry common sand should be strewed over the plaster-work, and struck smooth with an hollow rule in the same direction as the joists are laid, so that it may lie *rounding* between each pair of joists. Particular attention should be paid to the plaster-work and sand, that they be perfectly dry before the boards are laid, lest the latter become infected with the dry-rot. The mode of under-flooring may be successfully applied to a wooden staircase; but no sand is then to be laid upon the plaster-work. The method of extra-lathing may be practised on ceiling-joists, sloping-roofs, and wooden partitions.

The third method, namely, *inter-securing*, is similar to that of under-flooring; but no sand is afterwards to be laid over it. Inter-securing is applicable to the same parts of a building as the method of extra-lathing; but it is seldom necessary to be employed. Lord MAHON made several experiments, which shew the utility of this invention; but we can only refer the inquisitive reader to the 68th volume of the "*Philosophical Transactions of the Royal Society*," for 1778; where he will find a satisfactory account of the manner of preparing the mortar, as well as the result of numerous trials made by the inventor.—See also COUNTRY-HOUSES and FIRE-PROOF.

The most expeditious way of *extinguishing fire* is a matter of equal importance, as the security of buildings from that destructive agent. Hence various machines, and chemical preparations, have been invented by ingenious men, in order to promote so useful an object; one of the earliest contrivances was a barrel, filled with certain ingredients, first proposed by M. FUCHS, a German physician, in the year 1734; and which effectually answered the purpose for which it was designed.—A similar invention was introduced into this country by a Mr. ZACHARY GREYL, whose machines were made of wood, and contained only water; they were exhibited before several of the nobility, but did not meet with encouragement. In the year 1761 Dr. GODFREY produced certain vessels which in every respect succeeded. They are supposed to have been an improvement on Mr. GREYL's, were constructed with wood, and filled with a chemical liquor, consisting of water, oil of vitriol, and sal-ammoniac. When thrown into rooms and other places that were purposely set on fire, they burst, and by their explosion completely extinguished the flames: it is to be observed, that they were useless after the roof had fallen in. These contrivances, however, are evidently more calculated for ships, than to be employed on land; as they would be of great service for suppressing fires in vessels at sea, and might be considered as necessary a part of their cargo as naval stores, or ammunition.

In the 23d vol. of "*Annals of Agriculture*," Mr. WILLIAM KNOX, a merchant of Gothenburg, in Sweden, states that he has made a variety of experiments for extinguishing fire by means of such substances as are cheap and easily procured. He divides them into *simple* and *compound* solutions. In the former class, he proposes to add to 75 gallons of water, 9 gallons of the strongest solution of wood-ashes; or 6 gallons of the finest pulverized pot-ashes; or 8½ gallons of common salt, well dried, and finely beaten; or 8½ gallons of green vitriol or copperas, thoroughly dried and finely pulverized; or 11½ gallons of the strongest herring-pickle; or 9 gallons of alum reduced to powder; or 19 gallons of clay, perfectly dried, well beaten, and carefully sifted.

Among the *compound* solutions,

Mr. Knox recommends to mix 75 gallons of water with 10 quarts of clay, 10 quarts of vitriol, and 10 quarts of common salt; or a similar quantity of water, with 18 quarts of the strongest solution of wood-ashes and 18 quarts of fine clay reduced to powder; or the same proportion of water, with 15 quarts of red-ochre, or the residuum of aquafortis, and 15 quarts of common salt; or, lastly, to mix 15 quarts of the strongest herring-pickle, and 15 quarts of red-ochre, with 75 gallons of water.—All these different solutions, Mr. Knox remarks, are equally efficacious in extinguishing fire; but he prefers the compounds, as being the "surest and most powerful for that purpose."

Another of the various inventions for extinguishing fire by chemical means, deserving of notice, is the composition prepared by M. Von Aken, and which consists of the following ingredients:

	lbs.
Burnt alum - - - -	30
Green vitriol in powder -	40
Cinabrese, or red-ochre, pulverized - -	20
Potters', or other clay, finely pounded and sifted	200
Water - - - - -	630

With 40 measures of this liquor an artificial fire, which would have required the labour of twenty men, and 1500 measures of common water, was extinguished, under the direction of the inventor, by *three* persons. The price of this compound solution is estimated at one halfpenny per pound.

Water Engines for extinguishing fire. These are either forcing or lifting pumps; and as they are made to move with great velocity, their execution principally depends on the length of their levers, and the force with which they are worked.

Various engines have been contrived, from which we have selected the following, as they are the most ingenious, and at the same time calculated to produce the greatest effects.—In the year 1785, the silver medal and twenty guineas were conferred by the "Society for the Encouragement of Arts," &c. on Mr. Furst, as a reward for his contrivance to increase the effect of engines in extinguishing fires; of which the following is a short description: From a platform rises an upright pole or mast, of such height as may be judged necessary; a gaft slides upon it in an ascending direction, and along both is conveyed the leather hose from the engine. The branch, or *nose-pipe* of the engine, projects at the extremity of the gaft; towards which an iron frame is fixed, whence two chains are suspended; and from these hang ropes, which serve to give an horizontal direction to the branch; while other ropes, that run through proper pullies, and are thus conveyed down the mast, serve likewise to communicate a vertical motion to it. By these means, the branch or nose-pipe of the engine is conducted into the window of any room where the fire more immediately rages; and the effect of the water discharged is applied in the most efficacious manner to the extinguishing of the flames.

A patent was granted in January 1790, to Mr. Joseph Bramah, of Piccadilly, and to Mr. Thomas Dickenson, of Bedworth Close, in the county of Warwick, for a new improved engine on a rotative principle. The merits of this machine depend on its having two wheels or cylinders of brass, or any other metal; one of which is of a greater, and the other of a smaller diameter, in any proportion required; both are nearly of equal length, but may be increased or decreased, according to the purpose to which the machine is applied. As soon as the larger wheel is fixed, the smaller one is placed within it, and is fastened on an axis, so as to turn in a rotative direction round its centre; the smaller wheel being thus stationed, may be occasionally fixed, and the larger one moved in the same direction round the smaller one: the former of these, however, is preferable in all cases. At each end of the larger wheel there is a *flanch*, to which are screwed two plates, or caps inclosing its ends, and into which the extremities of the smaller wheel are inserted, so as to render the junction *water-tight*: through these caps passes the axis of the inner cylinder, in order to communicate motion from without.—Or the inner wheel may be applied so as to give motion, by its external end or ends, to any other engine or machine connected with it.—These are the component parts of Messrs. Bramah's and Dickenson's patent engines; for a more particular account of which, we refer the reader to the 2d vol. of the *Repertory of Arts and Manufactures*, where he will find a minute account of the machinery, and the effects it is calculated to produce.

A patent was likewise granted in December 1792, to Mr. Charles Simpkin, of Oxford-street, engine-maker; for his improvements in all kinds of machines for extinguishing fire.—This invention consists in exploding or removing the valves both from that part of the cylinder, where the vacuum is made by the piston or fly, and from beneath the air-vessel; and in making use of valves, by the application of certain filtering chambers, with partitions or divisions, to preserve the effect of the valves, during the use of any improper fluid. These filtering chambers are to be placed between the drawing valves, and the strainer in common use, on the suction-pipe. The partitions in the chambers may be of fine wire-work, or of any other substitute, that will act as a first and second filtration in the chamber.

The design of this invention is, to render the valves more free of access, and to prevent the necessity of opening any other parts of the engine, except the chambers containing the valves; by which means the effect of the machine is increased, and consequently the fire may be more easily extinguished.

To these different contrivances we shall add the American Fire-engine, of which we have given an accurate engraving. It was invented by Mr. Benjamin Dearborn, who communicated it to the American Academy of Arts and Sciences, from whose Memoirs for 1794, we extract the following particulars:

Description of the Plate representing the American Fire-engine, on a new construction.

Fig. 1. A B, and C D, are the edges of two planks, confined together by four bolts.—*a b*, and *c d*, are two cylindrical barrels, in each of which a piston, with a valve, is fastened to the spear *e*, and is moved up and down alternately by the motion

American Fire Engine.

Fig. 1

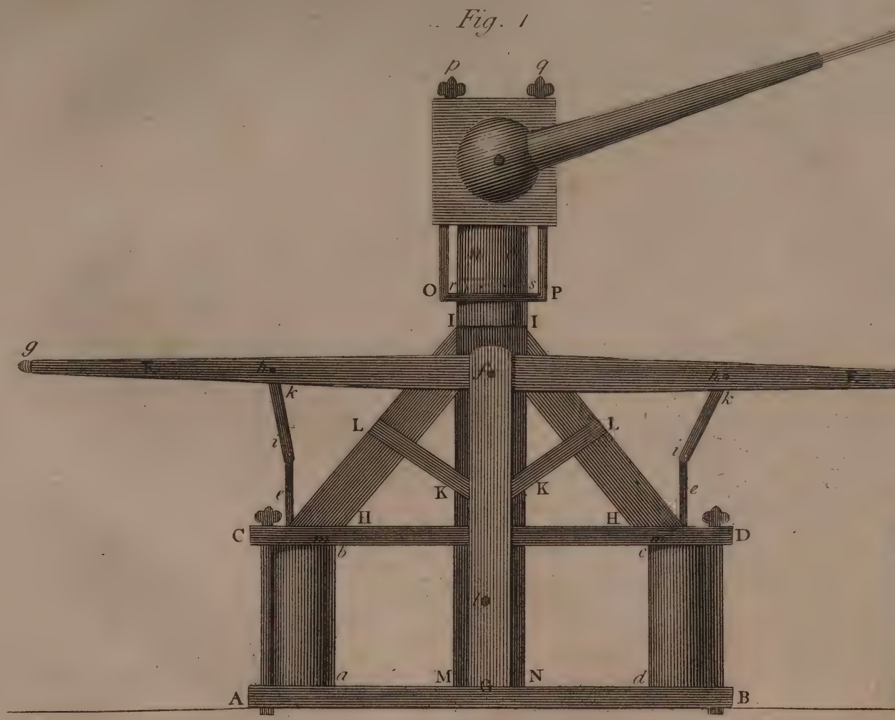
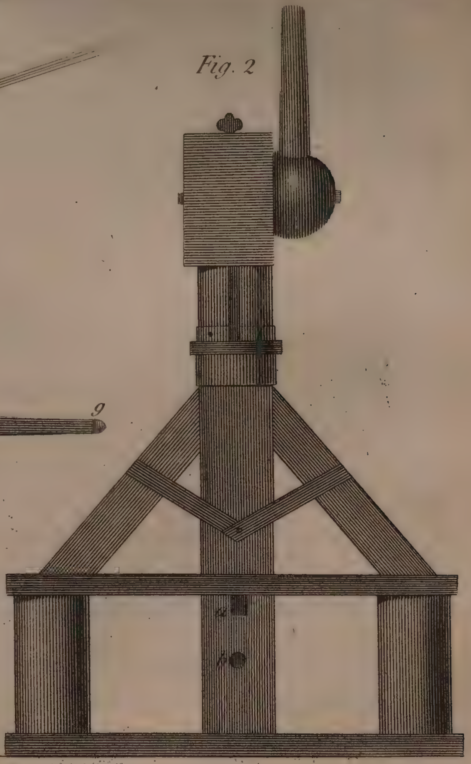


Fig. 2



motion of the arms E E. Beneath each barrel a hole is made through the plank A B, which is covered with a valve. The arms E E, are suspended on the common centre *f*: there are also arms parallel to these on the opposite side; *g g* are the ends of handles which are fastened across the ends of the arms. At *h*, a bolt goes across, from arm to arm, to which the piece *i*, *k*, is affixed, and on which it plays; the lower end of this piece is fastened to the top of the spear *e*.—G, *l*, *f*, is a standard for the purpose of supporting the arms, to which there is a correspondent one on the opposite side; both are notched into the edges of the planks, where they are secured by a bolt, which passes through them at *l*, and has a nut or fore-lock on the opposite side. H I, H I, are square braces, answering the purpose of ducts, through which the water ascends from the barrels, passing through the plank at *m*.—K L, K L, are irons in the form of a staple, in order to confine the braces: the lower ends of these irons meet, and are secured by a bolt, passing through them, and M N, *n o*, which is a piece that goes up through a mortice in the centre of the planks. This piece is square from the lower end, till it reaches the top of the braces; whence they become cylindrical to the top, the upper end being perforated sufficiently low down, in order to communicate with the braces. O, P, is an iron ring, that surrounds the tube, and has two shanks which ascend through the head, with screws on the top at *p*, *q*:—*r*, *s*, is a ferule nailed round the tube.

Fig. 2. is the same engine; the arms and standards being taken off, in order to delineate more clearly the mode of securing the braces; an object which is completely effected by a wedge driven into the mortice *a*: beneath the upper plank *b*, is a hole for admitting a passage to the bolt, which secures the standards. In this figure, a side view of the head is given, with the pipe in a perpendicular direction.

The machine is confined within a box, set on wheels, as in the common fire-engines. The whole is made of wood, excepting the spears of the pumps, and a few bolts, &c. The advantages of this machine are, that it can be made in any place where common pumps are manufactured; the interior work will not exceed *one-fourth* of the price of those which are constructed on the usual plan; and that they are incomparably more easy to work, than the common ones; circumstances which strongly recommend the American fire-engine to the attention of the public.

On the breaking out of a fire, all constables are enjoined, by several acts of parliament, to repair to the place; to use every exertion for extinguishing the flames; and to cause people to work, &c.—By the 10 Ann, c. 14, no action shall be commenced against any person in whose house or chamber a fire shall break out accidentally; but, if such fire happen through the negligence of any servant, the latter incurs a penalty of 100l. to be distributed among the sufferers; and, in default of payment, he is to be imprisoned for 18 months, during which time he is to be kept to hard labour.—The wilful setting of fire to any house, out-house, or other building, is felony without benefit of clergy.—See Gunpowder.

FIRE-ARMS, are those which are charged with powder and ball; such as musquets, carbines, pistols, cannons, &c.

In December 1780, a patent was granted to Mr. JOHN AITKEN, of Edinburgh, surgeon, for his invention of a new method of loading fire-arms, of whatever dimensions or forms, with two or more charges of powder and ball, and of discharging them in succession, by fire communicated through correspondent perforations, or touch-holes. This consists in lodging several charges of powder and shot in the fire-arms, whether cylindrical, conical, chambered, or otherwise; the hindmost extremity, or breech, being closed, while the anterior one, or muzzle, is open. The extension of the fire, in a posterior direction from the charge next the muzzle that is first inflamed, is intercepted by *intermedia* placed between the several charges, which are firmly rammed about or above the shot; and which are formed of any substance that possesses sufficient resistance, is compact, incombustible, and properly shaped. In the smaller fire-arms, namely, pistols, musquets, bluderbusses, &c. the patentee chiefly employs leather, or other thick stuffs. In the larger ones, such as cannons, mortars, &c. he makes use of various pastes, as being more commodious, and more easily procured. The charges are *ignited* through touch-holes, by the lock, or match, as occasion may demand, according to the size and condition of the tube.

A patent was likewise granted to JAMES WILSON, Esq. of St. Martin's in the Fields, for his improvement in the construction of fire-arms, by which the powder will be effectually screened against the influence of the weather, at a less expence than by other method. His invention consists chiefly in fixing a semi-circular piece of brass or iron, about one line in breadth, over the touch-hole, and which rises upwards with a bevil from the side that joins the barrel. Thus the wet or moisture, which in common fire-arms insinuates itself between the barrel and the hammer or upper pan, where the powder is most exposed, is effectually prevented, and carried off on either side of the arch, or semi-circular piece of metal, by the channel, which is formed by the bevil when in contact with the barrel. This improvement is also applicable to old pans.

FIRE-COCKS, are contrivances for admitting water into pipes or reservoirs: churchwardens in London, and within the bills of mortality, are enjoined to fix them at proper distances in streets, together with painted characters on the opposite wall, pointing out such distance. They are also ordered to deposit in every house thus marked, an instrument or key for opening a plug, and likewise a large engine, and an hand-engine, under the penalty of 10l.

FIRE-ESCAPE, a contrivance for the purpose of rescuing persons in imminent danger from fire.

In the *Annual Register* for 1775, an account is given of a machine for saving persons and effects from the flames. It consists, 1. Of a pole of fir, which may be of any convenient length, being about five inches in diameter at the bottom, and at the top or smallest end, about three inches. At the distance of three feet from the top, is a mortice through the pole, to which a pulley is fixed, that is nearly of the same diameter as that part of the pole. 2. A rope about three-fourths of an inch in diameter, and twice the length of the pole, at one end of which is a spring-hook, to pass through the handle of the basket, when used; it is put through the mortice over the pulley, and drawn tight on each side, nearly to the bottom of the pole, where it is secured till wanted. 3. A basket, which ought to be of strong wicker-work, three and a half feet long, two and a half feet wide, rounded off at the corners; and four feet deep, rounding every way at the bottom. To the top of the basket is fixed a strong iron curve, or handle, with an eye or ring in the middle: a small cord about the length of the pole, is likewise fastened to one side of the basket, near the top.—These being the principal parts, there are also several straps, &c. for securing the poles from sliding; of which the reader will find a minute account in the volume before quoted. This contrivance can be raised, and two or more persons may be taken out of the upper windows of a house, and let down safely in the street, within the space of *thirty-five seconds*, or in little more than half a minute.

A machine for this purpose has lately been invented by the Rev. Dr. Nicholas Collin, of Philadelphia, the following description of which we have abridged from the 4th vol. of the *Transactions of the American Philosophical Society.*—A strong wooden case is erected near the end of a rectangular stage of solid planks, mounted on four wheels (with locks to secure the latter when the machine is employed), for the reception of an upright round shaft. This shaft is moveable in the case, by means of two ropes fastened to its foot; which, after passing over two pullies or sheaves in the top of the case (one being on each side), are fastened to two windlasses, by winding or unwinding which, the round shaft is raised or lowered. On the top of this upright moveable shaft, is an iron fork with a transverse pin, on which rolls a lever with unequal arms. The longest arm is directed towards the fore-end of the stage, which it ought not to exceed in length, unless the hinder-end be proportionably loaded. The shortest arm is lowered or raised by a rope fastened to its extremity, which reaches to the posterior end of the stage, and may be pulled either by men or by a windlass: or, a compound pulley may be substituted for the rope. To the fore-end of the longest arm of the lever, a basket is suspended, by three iron rods, for the reception of persons or goods in danger, and which, by loosening the hinder rope, is thus lowered. As, however, in great elevations, the basket cannot reach the ground, a rope is fastened to it, by which persons or goods may descend.—Dr. Collin mentions a larger and a smaller kind of this machine, by the former of which twelve persons may be let down, and by the latter four. As he has not specified any dimensions, we suppose that they are to be proportioned to the height, at which houses and other buildings are in general erected, and to the number of persons the machine is intended to rescue.—We cannot, on this occasion, omit to point out the great utility of those *fringed ropes* which should be fastened to the foot of a bedstead, and extend to a sufficient length, to descend by them, in case of fire, through a window: they are sold by several rope-manufacturers in town, generally at two shillings per yard.

FIRE-IRONS, are those instruments which are employed in the management of a fire, namely, poker, shovel, and the different kinds of tongs. As the manufacture of these articles is acknowledged to be very unwieldy, Mr. SAMUEL BENTHAM, of Queen-square Place, in Middlesex, obtained a patent in the month of April 1793, for a new method of making fire-irons. His invention consists in forming those instruments *tubular*; the cylinders being closed at the ends, as well for strength as for keeping out dust: hence they acquire a degree of lightness, which the patentee affirms cannot be given them by any other means, with the same degree of strength. The joint of the tongs may be made in a manner similar to common ones, or with a spring-joint resembling that of sugar-tongs. The two legs are joined together by a flat, broad, semi-circular plate, hardened so as to acquire a proper degree of elasticity. The ends of the tongs may be either flat, as is usual, or hollow like a spoon. The materials may be either entirely iron, or those parts which are not intended to come in contact with the fire, may be of silver, plated work, or any other metal. With respect to the poker and shovel, the ends may, for the same reason, be in separate pieces from the stems; but as that of the poker is frequently exposed to the fire, it becomes necessary to make it, if tubular, much thicker than the stem.—The chief object of this contrivance is simplicity and lightness; but we doubt whether it is calculated for general use.

FIRE-PLACE, a contrivance for communicating heat to rooms, and also for answering various purposes of art and manufacture.—With respect to the latter kind, we propose to treat under the articles of FURNACE and STOVE.

In the construction of fire-places for domestic purposes, the chief object is the saving of fuel: with this intention, several ingenious artists have invented different kinds of grates, more or less adapted to that useful end.

The fire-places in general use are, 1. The large open ones, which were commonly adopted in former times, and are still retained in the country, and in kitchens: they require a wide funnel, consume a great quantity of fuel, and generally smoke, unless the door, or a window, be left open.

2. The modern fire-places generally adopted in towns, are constructed with low breasts and hearths, narrowed by jambs. These being more contracted than the antiquated chimnies, easily keep the room free from smoke; but the funnel necessarily occasions a considerable draught of air, which rushing in at every crevice, renders the situation of those who are exposed to it very uncomfortable, and even dangerous: for it is unquestionable, that most of the diseases that proceed from colds, may be justly attributed to the strong draught of chimnies, by which, in severe weather, persons are scorched *before*, while they are freezing *behind*. Such fire-places, therefore, are of little service in heating rooms, as the surrounding air, which is warmed

by the direct rays of the fire, does not remain in the apartment, but is continually collected in the chimney, by the current of cold air which surrounds it, and by which it is in a short time carried off. Nor is this the only inconvenience attendant on such improper contrivances, for the greatest part of the fire is lost, in consequence of its being absorbed by the back, jambs, and hearth, which are dark and obscure, and reflect very little, so that the heat flies directly up the chimney.

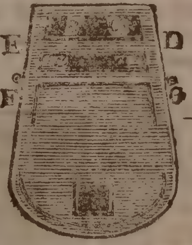
3. To remedy this inconvenience, an ingenious Frenchman, named Gauger, in the year 1709, proposed seven different constructions of a new kind of chimnies, in which there are hollow cavities, formed by means of iron plates inserted in the back, jambs, and hearth: through these the heat passes and warms the air in those cavities, which is thus continually communicated to the room. Although many advantages arise from this arrangement, yet the expence necessarily incurred, must ever be an insuperable obstacle to its general adoption.

4. Another kind of fire-place is the *Holland iron-stove*, which has a flue proceeding from the top, and a small iron door that opens into the apartment. They serve to warm a room, lessen the consumption of fuel, and to produce a constant change of air; but, as the fire is too much confined, it is neither sufficiently chearful, nor calculated for culinary purposes, and is therefore employed chiefly to work-shops.

5. The *German stove* consists of five iron plates, which are screwed closely together in such a manner, that the fuel may be put into it from another room, and even from the outside of the house. This stove warms rooms with little fuel, and is not attended with any danger from the irruption of cold air; but it admits of no change or draught of air in the room, and the fire is likewise concealed.

Such are the inconveniencies attending the fire-places in general use; and, though we by no means wish to depreciate the inventions of Count Rumford, yet we are of opinion that the *Pennsylvania fire-place*, which was originally contrived by Dr. Franklin, is eminently adapted to domestic purposes, both for its economy in the consumption of fuel, and on account of its efficacious mode of imparting heat. From these considerations, we have been induced to procure several cuts, by which the reader will be enabled to form a proper estimate of an invention which appears to be susceptible only of very few improvements. Dr. Franklin's machine consists:

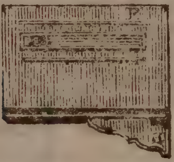
1. Of a bottom plate or hearth-piece, as in the annexed figure, with a rising moulding in front, for a fender;



with two perforated ears, F, G, for the reception of two screw-rods;—a long air-hole *a*, *a*, through which the external air passes into an air-box; and also of three smoke-holes, represented by dark squares in B, C, through which the smoke descends and escapes; beside these, there are double ledges for receiving the lower edges of the other plates.

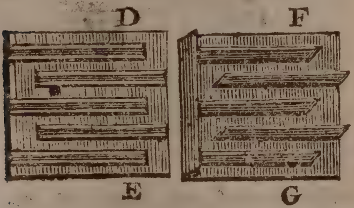
2. A back plate without holes, that is furnished with a pair of ledges to receive

3. The two side plates, each of which has a similar pair of ledges, for the reception of the side ledges of the front plate, together with a shoulder on which it rests; there are likewise two pair of ledges for the purpose of admitting the lateral edges of the two middle plates that form the air-box; and also an oblong air-hole through which the air warmed in the box is discharged into the room; together with a wing or bracket,



as at H, and small hole, as at R, in which the axis of the register is to move.

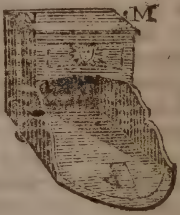
4. An air-box, which is composed of the two middle plates D, E, and F, G.



The first of these two cuts has five thin ledges or partitions, cast on it, the edges of which are received into as many pair of ledges, cast in the other; the tops of all the cavities formed by these ledges are covered by another ledge of the same form and depth, which is cast with them; so that when the plates are put together, and the joints luted, there can be no communication between the air-box and the smoke. In the winding passages of this box, fresh air is warmed, as it passes into the room.

5. A front plate, which is arched on the under side, and ornamented with foliage, &c.

6. A top plate,

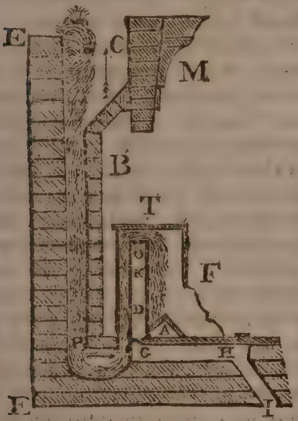


with a pair of ears, M, N, which correspond to those in the bottom plate, and are perforated for the same purpose. It has likewise a pair of ledges that run round the under side, in order to receive the top edges of the front, back, and side-plates. The air-box is two and a half inches shorter than the top plate. All these plates are of cast iron; and, when properly arranged, they are bound with a pair of slender rods of wrought iron, with screws; and the machine appears as in the preceding figure. There are also two thin plates of wrought iron, forming

7. The shutter; the length and breadth of which are so proportioned, as completely to close the opening of the fire-place; it also serves to draw the fire, or to secure it during the night. This shutter

is raised or depressed by means of two brass knobs; and it slides in a groove left between the foremost ledge of the side-plates and the face of the front plate.

8. The register, which is placed between the back plate and air-box, and is furnished with a key; so that it may be turned on its axis, and raised or lowered at pleasure in an oblique position. The operation of this machine, and the method of fixing it, may be understood by attentively observing the profile of the chimney and fire-places in the following figure.



M is the mantle-piece, or breast of the chimney; C the funnel; B the false back, made of brick-work within the chimney, at the distance of four inches from the true back, or upwards, from the top of which a closing is to be made over to the breast of the chimney; in order that no air may enter except that which passes under the false back, and ascends behind it. E is the true back of the chimney; T. the top of the fire-place; F the front of it; A the place where the fire is made; D the air-box; K the hole in the side plate, through which the warmed air is discharged from the air-box into the room. H is the hollow formed by removing some bricks from the hearth under the bottom plate, filled with fresh air, which enters at the passage I, and ascends into the box through the air-hole in the bottom plate near G, the partition of the hollow, and which is designed to separate the air and smoke.—P, is the passage under the false back, and part of the hearth for the smoke, the course of which is pointed out by the arrows delineated in the last figure. The fire is to be made at A, when the flame and smoke will ascend; strike the top T, and communicate to it a considerable degree of heat; the smoke will turn over the air-box, descend between it and the back-plate to the holes near G in the bottom plate; and heating in its passage all the plates of the machine, it will then proceed under and behind the false back, whence it will rise into the chimney. The air of the apartment contiguous to the several plates, and warmed by them, become specifically lighter than the other air in the room, and is compelled to rise; but, being prevented by the closure over the fire-place, it is forced out into the room; and ascending by the mantle-piece to the ceiling, is again gradually driven down by the stream of newly warmed air which follows; so that the whole room in a short time acquires an equal temperature. The air also that is warmed beneath the bottom plate, and in the air-box, rises out of the holes in the side plates, and thus warms, and continually changes that of the room.

In closing the chimney, it will be necessary to leave a square opening for a trap-door, by which a chimney-sweeper may ascend; and which may be made of slate or tin, and be placed in such a direction, that, by being turned up against the back of the chimney when open, it may close the vacancy behind the false back, and discharge the soot which falls in sweeping upon the hearth. It will also be convenient to have a small hole, about five or six inches square, cut through near the ceiling into the funnel, and provided with a shutter which, being occasionally opened, may carry off the heated air of the room, as well as the smoke of tobacco, &c.

For a farther account of the manner of using this fire-place, the advantages attending it, answers to cavils and objections, together with instructions for bricklayers in fixing it, we refer the reader to Dr. FRANKLIN'S "*Experiments and Observations on Electricity*," &c. 4to. 10s. 6d. 1769.

FIRE-PROOF, a term which expresses the effect of certain applications to combustible substances, especially in buildings, with a view to prevent them from being reduced to ashes. This important object may also be attained by means of erecting whole houses with a mixture of earth and clay, well beaten together, as devised by M. COINTEREAU, in his "*School of Architecture*," (8vo. Hildburghausen, 1793, in German); an ingenious work that, we believe, was originally published in the French language. Although we are persuaded that such a method of raising edifices is not only durable and economical, but the buildings also are thus effectually secured from fire, yet it will be of great importance to afford security to combustible dwellings already erected. For this useful purpose, M. BOULARD, architect, at Lyons, has lately discovered a very simple remedy, attended with little expence or trouble, and admirably calculated to defend wooden materials from being consumed by flames, though exposed to their influence for *two hours*. After many tedious experiments, he found that a solution of *pot-ash* is the most efficacious liquid for resisting the action of fire, longer than any other fluid. This observation induced him to apply that substance in a kind of paint or coating on wood, which was completely rendered *fire-proof*, in the following easy manner: Dissolve such a quantity of pot-ash in cold water as that fluid is capable of holding in solution, wash or daub with it all the boards, wainscoting, shingles, &c. which are intended to be prepared. Then dilute the same liquor with a little water; add to it such a portion of fine yellow clay as will make the mixture of the consistence of the common paint employed on wood; and lastly, stir into it a small quantity of flour-paste, in order to combine both substances intimately. With this mixture all wooden materials ought to be coated three or four times, similar to painted work. Thus, wood will be secured from the action of fire, though exposed to it for a time exceeding two hours; but the greatest advantage of this excellent preparation consists in the circumstance, that it prevents the wood from ever bursting into flames. — M. BOULARD remarks, that 20lbs. of sifted yellow clay, 1½lb. of flour for making the paste, and 1lb. of pot-ash, are sufficient to prepare a square rood (French measure and weight) of deal boards; so that the expences, when compared with the importance of the object, are indeed trifling. It is further deserving of notice, that even furniture made of wood, such as chairs, tables, &c. and particularly the stair-cases and flooring of dwelling-houses, may be so far enabled to resist the ravages of the fire, that they are only reduced to coals, or embers, without spreading the conflagration by additional flames: meanwhile, there are gained, at least, two hours, during which all valuable effects may be removed to a place of safety, and the lives of the family at the same time rescued from all danger.

FIRING-IRON, in farriery, is an instrument resembling the blade of a knife; which, being made red-hot, is applied to the hams, or to such other parts of a horse as may require it, for the purpose of cauterizing and discussing preternatural swellings, such as farcy, knots, &c.—This operation is called *firing*.

FIRKIN, an English measure for liquids, which is the fourth part of a barrel; it contains eight gallons of ale, soap, or herrings, and nine gallons of beer.—Two firkins make a kilderkin.

FISH, in natural history, an animal that lives in the water as its proper element.—See ANIMAL kingdom.

The most general, or popular division of these creatures, is into *fresh* and *salt* water fish. It has, however, been conjectured that they all naturally inhabit the ocean, and have only migrated into rivers.

According to LINNÆUS, there are about 400 species of this animal, with which naturalists are acquainted; but those yet unknown are supposed to be still more numerous, and as they are believed to live at great depths in the ocean, remote from the shores, many species will probably for ever remain undiscovered.

Having already treated of the different methods of angling for fish, under their respective heads of the alphabet, we shall at present confine ourselves to a few general observations.

Blowing of fish is a practice similar to that of blowing flesh, poultry, pigs, &c. and is adopted for the same fraudulent purposes. This operation is performed, especially on cod and whitings, by introducing the end of a quill or tobacco-pipe at the vent, and blowing through a hole made with a pin under the fin which is next the gill; thus making the fish appear to the eye large and full, though, when dressed, it will be flabby, and little more than skin and bones. Such imposition, however, may soon be discovered, by placing the finger and thumb on each side of the vent, and squeezing it considerably; the expulsion of the wind will be perceptible, the skin will collapse, and the fish appear lank and of little value.

In the *Gentleman's Magazine* for 1752, we meet with the following curious account of a method of carrying fish alive to a great distance: Take an ounce of white sugar-candy; saltpetre about the size of a walnut; and a similar quantity of wheaten flour; incorporate these ingredients till they become of the consistence of powder. This quantity is sufficient for a pail of water: having provided a convenient vessel to carry the fish, crumble into it some white bread; and when the water begins to grow warm, and the fish put up their heads to the top, add a small quantity of this powder, which cools the reservoir, and preserves the fish. The water, if possible, should be changed every four or five miles, and the powder added, as occasion may require. By these means, trout may be carried above forty miles alive, and in good health.

Feeding of fish.—When they are kept in large pools or ponds, either boiled malt, or fresh grains, is a very proper food; thus, carp may be reared and fed like capons, and tench will also prosper. If reared in a stew, any sort of corn, or leguminous fruit boiled, especially peas and malt coarsely ground, are equally fattening.

Fish, in general, are less nourishing than other animal food, though they are not difficult of digestion, while in a fresh state; but, when *salted,* they partake of the stimulating and pernicious properties of beef, or pork, accordingly as they are lean or fat. Although the rancid and putrescent tendency of fish may, in a great measure, be counteracted by acid sauces and pickles, yet they should never be eaten by febrile patients and convalescents, in whose stomachs their fat is insoluble, and almost indigestible. On the whole, we are convinced from experience, that *salt-water* fish are lighter and more wholesome, and that among these, what are commonly called *white fish,* are the most easy of digestion. Such as are fed in muddy ponds, or other stagnant waters, are, of all aquatic animals, the least conducive to health.—With respect to the most proper method of curing and dressing fish, there can be no doubt that such as are dried in the open air, and afterwards quickly boiled, afford the most salubrious nutriment. But *we* cannot approve of either *fried* or *broiled* fish, especially when *butter* is used for these culinary processes: hence, we think it our duty to reprobate those luxurious customs, as being highly pernicious to health; and to contradict, in the most solemn manner, the suggestions of a recent compiler, who has not hesitated, *indirectly* to countenance the use of that hurtful animal oil. For, though *liberally* availing himself of the industry and talents of others, he has not even acknowledged the sources which supplied him with the *principal* part of a volume.

FISHING, the art of catching fish, whether by means of nets and spears, or of lines and hooks. The former are used in fresh and salt waters, for the taking of large fish, which go in shoals; the latter are employed for catching single ones, such as bream, carp, &c. to which we refer.—See also ANGLING.

The most important point in fishing, is the proper season, together with the place, bait, and mode of application.—In March, April, and September, the warmest days are the most successful for this sport, when the bait should be deep; for during those cool months the fish lie near the bottom. For fly-fishing, the most proper seasons are the months of April, May, or June, after a gentle shower of rain has beaten the insects down upon the water, without rendering it turbid; and the most promising hours are about nine or ten in the morning, and three or four o'clock in the afternoon; in still, warm evenings, however, fish will readily bite, till night approaches; because at those seasons gnats are flying in great numbers.

In the hot days of Midsummer, when the earth is parched up, little success can be expected in any water. Nor will fish bite during cold weather, unless the evenings be warm and serene. The north and east winds are particularly unfavourable to fishing, as well as tempestuous weather in general; but, if a gentle breeze prevail, it will considerably facilitate the operations of the angler. For farther particulars relative to the proper seasons, baits, lines, hooks, &c. for taking fish, we refer the reader to ISAAC WALTON's *Complete Angler*, 8vo. 1784, where he will find ample instructions, blended with considerable amusement.

FISHING-NET, a contrivance of a reticular texture, thus denominated, as it is appropriated solely to the taking of fish.

These nets are in general made by the hand; but, as that method is necessarily tedious, and inadequate to supply the demand in populous fishing ports, Mr. J. W. BOSWELL, of Barnstaple, Devon, in the year 1795, invented a machine for the purpose of weaving nets, for which the Society for the Encouragement of Arts, &c. in 1796, conferred on him a premium of fifty guineas. His loom is calculated to make 68 meshes at the same time, and by the same motion, with a perfectly fast knot, which does not differ from those employed by fishermen:—nets thus manufactured have a complete selvedge, and are not liable to decay from the knots becoming loose, a circumstance of considerable importance to those employed in the fisheries. We regret that Mr. BOSWELL's ingenious machine is too complicated to give the reader a competent idea of its mechanism, without illustrating it by an engraving; and, as few persons in *domestic* life will attempt to make their own fishing-nets, we refer the curious reader to the 14th vol. of the Transactions of the Patriotic Society above mentioned, where he will find an ample description, together with a plate explaining the whole of the machinery.

FISH-PONDS, are those reservoirs made for the breeding and rearing of fish. They are considered to be no small improvement of watery and boggy lands, many of which can be appropriated to no other purpose. In making a pond, its head should be at the lowest part of the ground, that the trench of the flood-gate, or sluice, having a good fall, may, when necessary, speedily discharge the water. The best method of securing the work, is to drive in two or three rows of stakes, at least six feet long, at a distance of about four feet, extending to the whole length of the pond-head, the first row of which should be rammed not less than four feet deep. If the bottom be false, the foundation may be laid with quick-lime; which, slaking, will make it as hard as a stone. Some persons place a layer of lime, and another of earth dug out of the pond, among the piles and stakes; and, when these are well covered, drive in others as occasion may require, and ram in the earth as before, till the pond-head be of the height designed.

The dam should be made sloping on each side, and a waste left to carry off the superabundant water in case of floods or rains; the depth of the pond need not exceed six feet, rising gradually in shoals towards the sides, in order to allow the fish to *sun* themselves, and deposit their spawn. Gravelly and sandy bottoms, especially the latter, are well calculated to promote the breeding of these animals: and a fat soil, with a white rich water, such as the washings of hills, commons, streets, sinks, &c. is said to be the most proper for fattening all sorts of fish.

For storing a pond, carp is to be preferred, on account of its delicacy, quick growth, and prolific nature, as it breeds five or six times a year. This fish delights in ponds that have marl or clay bottoms, with plenty of weeds and grass, on which it chiefly subsists during the hot months.

In a late publication, we meet with the following singular method of furnishing a fish-pond with a variety of fish: About the latter end of April, or the beginning of May, take the root of a willow that stands near the water side, and is full of fibres; wash off the earth which adheres to it, then fasten it to a spike, and drive it into a river or pond well stored with fish: they will speedily be induced to deposit their spawn or roe on the fibres of the root. After a few days (in cool weather, perhaps, *weeks*), remove the spike, with the willow root, from the pond, and convey it to that which you design to store, driving it to the depth of four or six inches under the surface of the water; and, in about a fortnight, a great number of young fish will appear. The root, however, should not be left too long in the first pond or river, lest the heat of the sun animate the spawn, and disengage it from the root.

Ponds should be drained every three or four years, and the fish sorted. In those which are kept for breeding fish, the smaller kind should be taken out, for storing other ponds; but a good stock of females, at least eight or nine years old, ought to remain, as they never breed before that age.

Stealing of fish, by persons armed and disguised, is felony without benefit of clergy, by 9th Geo. I. c. 22, and by 5th Geo. III. c. 14; the penalty of transportation for seven years, is inflicted on persons committing depredations on fish, in any water, within a park, paddock, orchard, or yard; as likewise on the receivers, aiders, or abettors; and a forfeiture of 5l. to the owner of the fishery is to be paid by persons taking or destroying (or attempting so to do) any fish in rivers or other waters within an inclosed ground, being private property.

FISTULA, in general, denotes any ulcerated and sinuous cavity, with callous and elevated edges, which extends to a carious bone.

This formidable disease is, according to the parts which it attacks, called either *fistula lachrymalis*, that is, a sinuous ulcer of the lachrymal sac or duct, beginning with a tumor between the inner cornea of the eye, and the side of the nose; or a *fistula in perinæo*, namely, an ulcer communicating with the urinary canal, but sometimes opening into the bladder; or *fistula in ano*, when the ulcer is in the vicinity of the rectum or straight-gut.—The first generally appears in ricketty children, or such as are subject to glandular obstructions; the second may arise from wounds in the bladder and of the urethra, from external violence, &c. but is most frequently occasioned by certain diseases with which voluptuaries are punished; and the last is produced by whatever tends to form matter about the anus, by piles, soft tumors, hardened feces, or in consequence of irritation and inflammation, terminating in suppuration.

It would be needless to enlarge upon the treatment of this complaint, the cure of which cannot be entrusted to unskilful hands; nay, medical and surgical advice are often inadequate to relieve the unhappy sufferer, especially from the last species of fistula, after an operation has been ineffectually performed. Indeed, the frequent unsuccessful attempts of the most experienced operators, have encouraged a degree of quackery in this malignant disease, which ought never to be submitted to dabblers; as the delay of proper advice cannot fail to be attended with fatal effects. Hence we think it necessary to caution the unwary against the insidious attempts of those eccentric impostors (particularly in the west end of the metropolis) who extort large sums of money from the unhappy patients, under the specious promise of curing a fistula, *without cutting*.

After the disorder has been suffered to prey upon the internal parts, and the bones in the vicinity have become affected, or carious, we venture to pronounce that it is incurable. But, if the patient be of a *sound* constitution, and has not neglected himself at the *commencement* of the malady, he may doubtless be cured by *professional* treatment, an appropriate diet, consisting of light and nutritive food, and abandoning every kind of stimulating and heating aliment, both in a liquid and solid state. Hence game, pork, wine, spirits, coffee, and spices, are here equally improper.—Lastly, we are inclined to believe, that the external use of *living snails*, or at least the expressed juice of them frequently applied to fistulous ulcers at their commencement (especially after completely laying open the sinus), will have an excellent effect in stopping the progress of the disease; and, by sufficient perservance, probably accomplish a cure. There are several well-attested cases, that this simple remedy has recently been found of excellent service in removing *scrophulous ulcers*, which had resisted every other mode of treatment.

FITS. See CONVULSIONS; EPILEPSY; HYSTERICS; and SPASMS.

FIXED-AIR, an aërial fluid which is disengaged from all substances liable to undergo the vinous fermentation, as well as by mixing alkaline salts and earths with acids. It is, strictly speaking, a *gas* which is essentially different in its properties from atmospheric *air*, as the former is unfit to support either the respiration of animals, or the burning of a candle; being likewise specifically heavier than the common air we breathe. From its acid properties, it has been variously denominated *aërial acid*, *cretacious acid*, or *carbonic acid*: and, from its noxious qualities, it has received the name of *mephitic gas*. The appellation of *fixed air* has been applied to it from its readily losing its elastic property, and fixing itself in various bodies, especially those which are of a calcareous nature.

Fixed air was first discovered by DR. BLACK, who, in consequence of various experiments, found that chalk, and the other earths reducible to quick-lime by calcination, consist of an alkaline earth, which is soluble by itself in water; but which, when combined with a large quantity of fixed-air, becomes insoluble; losing the properties of quick-lime, and assuming the appearance those earths naturally have, when not reduced to a calcareous state.

Dr. Black observed the same phenomenon in white magnesia, and in alkalis both fixed and volatile. Their effervescence with acids, and their mildness, depend on the fixed-air which these bodies contain; because alkalis and calcareous earths become in a high degree *caustic*, when divested of that gas. He farther remarked, that *fixed-air* had different degrees of affinity with various substances; being stronger with calcareous earth than with fixed alkali; with the latter than with magnesia; and with this than with volatile alkali.

This new gas was introduced into the catalogue of medicines, by its strongly *antiseptic* properties: it cannot, however, on account of its fatal effects, be inspired in large quantities, though in small portions it may be inhaled without danger.

Dr. Percival first administered it on a large scale, and directed his patients, in more than thirty cases of pulmonary consumption, to inspire the steam of effervescing mixtures of chalk and vinegar through the spout of a coffee-pot. By this treatment, the hectic fever was, in several cases, considerably abated, and the matter expectorated became less offensive, and better digested. Although Dr. Percival was not so fortunate as to effect a cure in any one instance, yet the late Dr. Withering met with better success; as one of three patients was thus restored to perfect health; another received great benefit, and was much relieved; and the third was kept alive by inhaling this gas for more than two months. Fixed-air, however, can only be employed with advantage in those stages of pulmonary consumption, when a purulent expectoration, or a rupture and discharge of an abscess in the lungs, have taken place: in such cases, this remedy affords a powerful palliative.

Farther, it is equally useful when applied to foul ulcers; and instances have occurred, in which the sanies, or corrupt matter issuing from *cancers*, has been sweetened, the pain alleviated, and a better suppuration produced, even after the carrot-poultice had failed. But, though fixed-air evidently checks the progress of a cancer, there is reason to apprehend that it never will effect a cure.

Considerable benefit has also been received in ulcerated sore-throats, from inhaling the vapours arising from effervescing mixtures. This remedy ought, however, by no means to exclude the use of other antiseptic applications.

In that dreadful disorder, the malignant fever, wines strongly impregnated with fixed-air may be administered, with a view to check the septic ferment, and to neutralize the putrid matter in the stomach and intestines. If the patient's common drink were thus prepared, it might be attended with beneficial effects.—As the latter stages of malignant fevers are generally accompanied with putrid diarrhœas, this evacuation ought not to be restrained by the use of *astringent* medicines; because the retention of putrid matter in the body will aggravate the delirium, and increase the vehemence of the fever. And if the disorder be suffered to take its usual course, death is the inevitable consequence.—In cases of this dangerous nature, mephitic or fixed air, produced from a mixture of chalk and oil of vitriol, has been injected into the intestines, by means of the instrument employed for tobacco clysters; by which application the violence of the diarrhœa was quickly abated; the heat and fetor of the stools corrected; and every alarming and dangerous symptom in a short time removed.

The last disorder in which the use of fixed air has been attended with success, is the *calculus*, or *stone*, of which it is said to be an excellent solvent; but, as the experiments made on this subject have not hitherto accurately determined its efficacy, we cannot speak of it with any degree of confidence.—See STONE.

FLAG: See FLOWER-DE-LUCE.

FLAG, the SWEET, or *Acorus calamus*, L. an indigenous perennial plant, growing in shallow, standing waters, rivulets, and marshy places. It delights in an open situation, and might be transplanted into gardens, where it will thrive, if the ground be moist, and not shaded by trees; but unless it grow in water, it never produces flowers, which appear about the latter end of June, and continue till August.

The root of this vegetable has a very agreeable flavour, which greatly improves by drying. It is affirmed to possess carminative and stomachic virtues, having a warm, pungent, bitterish taste, and is frequently used as an ingredient in preparing bitters, though it is said to impart a nauseous flavour.

In the opinion of LINNÆUS, the powdered root of the sweet flag might supply the place of our foreign spices; and is the only genuine aromatic plant of cold climates. Others assert, that agues have been cured by it, after the Peruvian bark had failed. These roots are commonly imported from the Levant, but those reared in Britain are in no respect inferior. The fresh root candied, is used at Constantinople as a preservative against epidemic diseases.—See GOUT.

According to BECHSTEIN, the leaves may be employed for dispelling many noxious insects: hence we recommend them particularly against the *moths* infesting woollen cloth, and the destructive worms in books; for which purpose they might, every year, be replaced in the corners of drawers and shelves.—M. BAUTSCH has used the whole plant for tanning leather; and Dr. BÖHMER remarks that the French *snuff*, called *a-la-violette*, probably receives its peculiar scent from this fragrant root.—Neither horses, cows, goats, sheep, nor hogs, will eat the herb or roots of this vegetable.

FLAIL: See THRESHING.

FLANNEL, a kind of light, porous, woollen stuff, woven on a loom with two treddles, in a manner similar to baize.

This is unquestionably one of the most useful articles of wearing apparel; and it is much to be regretted, that it is not more generally worn, as we are fully persuaded, that it would be the means of preventing many diseases.

The principal objection to the wearing of flannel appears to be, that it irritates the skin, and occasions disagreeable sensations: these, however, continue only for a few days, and the subsequent advantages, thence resulting, amply compensate

pensate for such temporary uneasiness. Both young and aged would derive from it equal advantages.—We do not, however, mean to insinuate, that flannel next the skin should be *universally* and indiscriminately worn by infants and young persons; though it is an ill-founded assertion of its adversaries, that it has a tendency to produce eruptions; as it evidently opens the pores, promotes perspiration, and thus removes the principal *cause* of cutaneous diseases that originate from an obstructed and irregular state of the skin.

There are, however, certain cases in which *flannel* cannot, with strict propriety, be used as an under-dress. In order to enable the reader to ascertain whether its constant use be advisable or not, we shall point out the leading circumstances which may, in this respect, influence his determination: it is a *salutary* dress to all those, in general, who have passed the meridian of life, or the 35th year of their age; though they should not have been accustomed to it from their infancy; to persons of a cold and phlegmatic habit, or leading a sedentary life; to such as are subject to fits of the gout, rheumatism, frequent colds and catarrhs; to individuals very susceptible of impressions connected with the vicissitudes of air, weather, and climate; as well as to nervous patients, and those who have recently recovered from severe chronical diseases.—On the contrary, the wearing of flannel next the skin may be *injurious* to constitutions so organized that they are liable to profuse perspiration, on taking even moderate exercise; or to those who are already afflicted with scorbutic or other eruptions of the skin; or, lastly, to all such irritable and whimsical persons as possess neither bodily nor mental vigour sufficient to overcome the first uneasy sensations which it occasions. But we are fully warranted to assert, from daily experience, that the habitual use of this beneficent texture, has essentially contributed to the recovery of numberless ricketty children, not less than to the saving of others who were born of feeble and enervated parents. In short, there is every reason to believe, that a *more general* adoption of this salutiferous cloth might prevent many fatal inflammations of the throat, breast, lungs, &c. to which the poorer class of people are remarkably liable; and thus preserve the lives of multitudes who now become a prey to our damp and variable climate.

FLATULENCY, a very common disorder, arising from vapours generated in the stomach and intestines. It occasions distensions, disagreeable sensations, and frequently a considerable degree of pain.

Sedentary persons, and those who are of a delicate constitution, especially women, are very liable to attacks of this complaint, which is generally induced by the eating of peas, beans, and other leguminous food. Animal fats, especially those of mutton and veal, if immoderately used, with large draughts of liquor immediately after eating them, are apt to turn rancid on the stomach, and to be accompanied with flatulency. The drinking of turbid or feculent liquors, whether new or old, as well as excessive potations of *hot tea*, produce a similar effect. The habit of the patient likewise contributes towards the generation of these causes; so that in phlegmatic constitutions, where the bowels are of a dry and costive disposition, this complaint is most frequent and painful.

The general method of treating flatulency consists in administering hot aromatics, which, however, ought to be taken with great caution, as they often irritate rather than relieve the parts affected.—The poorer class, who are subject to flatulency, usually have recourse to drams, low wines, or punch—remedies which are extremely improper; and, though they afford a temporary relief, eventually impair the appetite and constitution.

The safest mode of treatment is, to keep the bowels gently open by means of *clysters*, prepared of half a pint of mutton-broth, in which half an ounce of caraway-seeds has been boiled, adding two spoonfuls of sweet-oil, and one of soft sugar; which should be repeated three or four times in twenty-four hours. During the intermediate days, gentle laxatives, consisting of single drams of vitriolated tartar, dissolved in one ounce of cinnamon water, may be taken every three hours, till they produce the desired effect, in order to attenuate the viscous matter in the bowels.—See also Colic, p. 32.

But if the paroxysms of flatulency be violent, and accompanied with vomiting and other distressing symptoms, so that neither absorbents nor carminatives relieve the patient, we are informed by Dr. Reich, that great and immediate benefit has been derived from his method of extracting the air from the bowels, by means of a common clystering syringe; or, still more effectually, by the machine of which we have given a short account in our first vol. p. 22.—This useful instrument, we understand, is manufactured by George Göring, an ingenious turner of Fürth, a town in Franconia, who sells it at a price of from 10s. to 18s.

FLAX, or *Linum*, L. an indigenous plant, consisting of four species, of which the following are the principal:

1. The *usitatissimum*, or Common Flax, which grows in cornfields, and sandy pastures, and flowers in the month of July.—This valuable plant thrives most luxuriantly on ground newly broken up; which it ameliorates, if it be sown only every sixth year. The best preparatory crops for flax are those of hemp and potatoes. In the fens of Lincolnshire, hemp is sown the first year, on a good free open loam, that has been well tilled, the soil being properly manured with pigeon's dung; the second year again hemp is cultivated without any manure; and, in the succeeding year followed by flax.

With respect to the quality of *linseed*, from which *flax* is propagated, that imported from Riga is generally supposed to be the best, and is sown broad-cast with clover, in the proportion of 2, or 2½ bushels per acre. Experience, however, has evinced, that any other seed would be equally successful, if it were properly kept for six or seven years, before it is sown; for the merchants of Riga frequently import linseed from Germany and other countries, which, after several years, they again furnish with the same seed, but at an advanced price. It would farther be an useful practice, to exchange linseed among farmers living at some distance; as it has been observed that it improves, when cultivated in a different soil and climate.—See also Linseed.

In order to prevent the depredations of birds on this valuable seed, circumspect farmers sow it after sun-set on land well pulverized, and harrow it in early the next morning, before the sun rises.—Thus the seed, being moistened by the night's dew, is easily enveloped with earth, and rendered invisible to birds.—Another great enemy to the prosperity of the flax-plant, is the parasitical weed called the Greater Dodder (which see), or *Cuscuta Europœa*, L.—Bechstein communicates the following remedy, by which it may be easily and completely extirpated :—To every bushel of linseed, take two drams of camphor reduced to powder, by adding fifteen drops of spirit of wine ; and mix it well with the seed on the evening when it is to be sown.

As soon as the crop attains the height of four inches, it will be requisite to weed it ; an operation which ought to be performed with the greatest care, that the flax may not be trodden down. If it be allowed to grow longer, the stalks will be so much bent and broken, that they never regain their former straightness. When the weeds are carefully eradicated, they should be carried off the field, and on no account be suffered to lie in the furrows, because they often strike root again, and thus injure the growth of the flax.

This plant becomes ripe when it is in full blossom ; but, if it be intended to stand for seed, it will not attain to maturity till the milky juice which it affords is dried up ; at which time it is to be *pulled*, in order to be prepared for the manufacturer.

The first process which flax undergoes, is that of *rating*, or steeping it in water, to loosen and separate the rind from the stalk. The early flax is generally watered by laying it in bundles, in a pond or reservoir of soft water, where it is pressed down by stones, or other heavy bodies. In the course of a week, the rind will be sufficiently loosened, when the flax ought to be removed from the water, spread out in the air, and dried. Great skill and precaution are necessary in this part of the operation ; for should the flax be left too long in the water, the filaments or threads will become rotten and useless : it will therefore be preferable to take it out rather at an earlier period, than to leave it too long in the pits.

Another process is that of *dew-ripening* ; which is performed by spreading the flax on the grass, so that the joint action of the rain and dew produces an effect similar to that of rating. In some parts of Germany, it is never steeped in water, but only exposed for several weeks to the air, rain, and sun ; by which it is said to become finer and softer than by any other method.

To these operations may be added that of *rippling*, namely, the separating of the seed from the stalk, by passing the flax through a kind of comb before it is rated or watered. These combs are made of iron, the teeth of which are so closely set together, that the heads cannot pass through, and consequently are pulled off.

Some cultivators, however, beat the seed out in the field where it grew, instead of rippling, by means of a heavy piece of wood fastened to a bundle ; after which it is sifted clean into a large sheet.

In this state the flax is ready to be manufactured into LINEN; for a short account of which process, we refer the reader to that article.

Many attempts have been made by ingenious persons, to improve flax, or to render it finer, softer, and equal to silk in spinning. In Ireland, this object has, in a great measure, been attained by boiling it for several hours in sea-water, with the addition of a lye made of unslacked lime, and two or three parts of pot-ashes: thus we have seen the coarsest part of flax, or *tow*, considerably changed in its texture, so as to resemble the finest *lint*.—In the 69th Report of the Economical Society of Leipzig, printed in 1797 (in German), we meet with the following process of converting flax into a silky substance, communicated by Count HARRSCH, director of the mines in Russia: Take pure combed flax, tie it up into rollers covered with white buckram, fasten them with packthread, and deposit them for a fortnight in a damp cellar. Then open the flax, and place it under the cylinders of a common mangle, where it should be rolled over five or six times, in a manner similar to that pursued with linen. Next, the flax should be passed through a fine brass comb. This process of mangling and combing must be repeated a second and third time, but the combs ought to be progressively finer. By such treatment (the Count informs the Society) a very fine, tender, and glossy flax, may be obtained, scarcely inferior to *China silk*; and, though it loses more than one-third of its substance, yet the refuse, or tow, is uncommonly fine, and still useful for the manufacture of ordinary linen.

He farther observes, that, after each combing, particularly the first, the filaments appear flat and compressed, but that they recover their roundness by the subsequent operation. Flax thus prepared cannot, by mere contact, or the sense of feeling, be distinguished from silk, and is fit to be manufactured into the finest cambric, and Brabant lace.

Of the utility of flax or linseed, in *fattening cattle*, we have already treated in vol. i. p. 463.

Beside these various purposes, flax may also be considered as a *manure*: for the land on which it is spread, in order to prepare it for housing, is thus in a considerable degree ameliorated; and, if rated flax be laid on a coarse, sour pasture, the nature of the herbage will be totally changed; and the sweetest grasses will in future grow on such indifferent soil.—The water, too, in which the flax is immersed, if properly sprinkled on land, by means of watering carts, will produce a very fertilizing effect, and increase its value ten or fifteen shillings per acre. But this water is of so poisonous a nature to cattle, that the practice of macerating or steeping flax, in any pond or running stream, is, by the 33d HENRY VIII. c. 17, prohibited under very severe penalties.

2. The *catharticum*, or PURGING FLAX, or Mill-mountain, is an annual plant, growing in dry meadows and pastures, and flowering from June to August. It is eaten by horses, sheep, and goats.—An infusion of two drams of the dried plant is an excellent laxative, and has been given with advantage in obstinate rheumatisms.

FLAX, TOAD, the COMMON YELLOW, or *Antirrhinum Linaria*, L. an indigenous perennial plant, which grows in barren meadows, pastures, and road sides, and is in flower from July to September.

Cows, horses, and swine, refuse this noxious and, according to Bechstein, poisonous weed; nor is it relished by sheep and goats.—An infusion of the leaves, however, has been used as a diuretic, and purgative; a decoction of the flowers is said to be very efficacious in cutaneous disorders. An ointment prepared from the leaves, is reputed to afford considerable relief in that painful malady, the piles.—In dyeing, Suckow and Dambourney remark, that the fresh herb, while in blossom, imparted an olive colour to woollen cloth and silk. Böhmer thus obtained only a weak yellow liquor, of a greenish shade.

FLEA, or *Pulex*, L. in zoology, a genus of insects requiring no particular description.

Want of cleanliness remarkably contributes to the generation of fleas; as the females deposit their eggs, each from twenty to thirty, in damp and filthy places, within the crevices of boards, on rubbish, &c. whence they emerge in the course of six or eight days, in the form of greasy whitish maggots. When a fortnight old, they envelope themselves in a small chrysalis, from which they sally forth, after ten days existence, in the form of fleas. In the winter, these different transformations require a period of six weeks, but in summer only a month. They probably do not live longer than *one* year; though it is said, that fleas have been kept on little golden chains for *six* years. As they are able to draw a weight eighty times greater than that of their own bodies, some frivolous persons have occasionally kept them harnessed to miniature carriages, &c. Leaping also is a singular proof of their muscular strength; as, by pressing the belly downwards, expanding their legs, and then suddenly contracting them, these creatures dart forward to a distance of 10 or 12 inches.

Children and females are remarkably liable to the attacks of this little enemy; a circumstance which must be attributed to their more tender skin, their purer blood, longer clothes, and, in some individuals, perhaps to a peculiar state of perspiration.—Cleanliness, and frequent sprinkling of the room with a simple decoction of wormwood, will soon exterminate the whole breed of these troublesome vermin; and the best remedy to expel them from bed-clothes, is a bag filled with *dry moss*, the odour of which is to them extremely offensive.—Others cover the floors of the rooms where fleas abound, with the leaves of the alder tree, while the dew is on the foliage, to which these insects fondly adhere, and thus may be easily destroyed. Mercurial ointment, sulphur, and fumigation with the leaves of penny-royal, or the fresh-gathered foliage of that plant, sewed up in a bag, and laid in the bed, are also remedies pointed out for the expulsion of fleas.

Dogs and cats may be effectually secured from the persecutions of these vermin, by occasionally anointing their skin with sweet oil.

FLEA-BANE, the Great, or Plowman's Spikenard, *Conyza squarrosa*, L. an indigenous biennial plant, growing in mountainous meadows and pastures, in a calcareous soil, and producing yellow flowers in the months of July and August.

This plant possesses the odour of musk; the smoke, occasioned by burning it, was formerly much employed for the destruction of fleas, gnats, and other insects. It was also recommended in cutaneous disorders, but is at present exploded from the shops.—In a similar manner has the CANADA FLEABANE, or *Erigeron Canadense*, L. lost its reputation, both for banishing fleas, and answering other superstitious incantations; for which it was celebrated in former times.

FLESH-MEAT, or the flesh of animals prepared for food, is an important object of domestic economy.—In this place, however, we shall communicate only the most proper and effectual ways of preserving such meat in a fresh state, especially in the hot days of summer, as we treat of its relative salubrity and influence on health, under the distinct heads of BEEF, MUTTON, PORK, VEAL, &c. as well as under the general head of FOOD.

In a work entitled "*Miscellanea Curiosa*," by Mr. JONES, we find an easy method of preparing flesh-meat, without spices, and with very little salt; yet so as to keep good, and always ready for eating, for two or three years, and in the warmest climates. He gives us this account of the Moorish Elcholle, made of beef, mutton, or camel's flesh, but chiefly of beef; which is uniformly cut in long slices, well salted, and suffered to lie twenty-four hours in the pickle. It is then removed from those tubs or jars, into others filled with fresh water; and, when it has lain a night, it is taken out, put on ropes, in the sun and air to dry. When thoroughly dried and hard, it is cut into pieces of two or three inches long, and thrown into a pan, or cauldron, which is kept ready with boiling oil and suet sufficient to cover it; thus it is boiled, till it be very clear and red on cutting it; when it is again taken out and set to drain. After having undergone this process, it stands to cool, while jars are prepared for storing it; at the same time pouring upon it the liquor in which it was fried; and, as soon as it is thoroughly cold, the vessels are closely stopped. Preserved in this manner, it will remain hard, and keep two years: indeed, the hardest is considered as the best and most palatable. Thus it is brought to table by the Moors, who sometimes fry it with eggs and garlic, sometimes stew it and squeeze on it the juice of lemon. It is affirmed to be a very good dish, either hot or cold.

Another method of preserving flesh-meat, especially veal and lamb, is practised in Germany, and consists simply in immersing them in skimmed milk, so as to cover the whole joint. In warm weather, the milk should be changed twice the first day, and once in twenty-four hours; but, in a cool temperature, it is sufficient to renew it every two or three days. Thus, the meat may be kept in a sweet state for several weeks; but it ought to be washed in spring water before it is dressed.—Game and beef, however, cannot be preserved in the same manner, and therefore should be wrapped in a clean linen cloth, and buried in a box filled with dry sand, where it will remain sweet for three weeks, if deposited in an airy, dry, and cool chamber.

One of the cheapest means of preventing putrefaction in flesh-meat, would be that of covering it with *charcoal* powder (see vol. i. p. 494);

494); but experiments are still wanting to ascertain its effect on animal substances of different kinds. We think, however, there can be little doubt entertained of the successful result.—With respect to the best method of *pickling* meat, we refer to the articles BEEF and PICKLE.

FLEUK-WORM, or FLEWK-WORM, *Fasciola hepatica*, L. an insect, of the size and shape of a child's finger-nail: it creeps up the gall-ducts from the intestines, and, preying upon the livers of sheep, occasions coughs and consumptions in those animals.

Sheep, pasturing in moist grounds, are frequently attacked by this insect, which Dr. DARWIN conjectures to arise from the bile becoming too much diluted, in consequence of their watery food; so that it does not possess sufficient acrimony to prevent the depredations of flewk-worms.

The remedy in general prescribed, is to dissolve one ounce of salt in water; but Dr. DARWIN suggests, that the salt may be used with greater advantage, if hay were moistened with the solution, which would thus supply more wholesome nourishment, than is usually given to sheep troubled with these vermin.

FLINT, or *Silex*, L. a kind of opaque stone, which is, in general, of a roundish form, covered with a white crust, of a smooth uniform texture, and so hard, as to emit fire, when stricken against steel. It is chiefly used in the manufacture of glass.—For this purpose the hardest flints are selected, such as will resist the file, and become white when calcined. They are first cleansed from the white crust adhering to them; then burnt in a strong fire, and thrown, while red-hot, into cold water. After cleaning them of the ashes, the flints are finely pulverized in an iron mortar, and passed through a sieve. Weak aqua-fortis is next poured on the powder, with a view to dissolve any particles of iron perhaps acquired from the mortar. This mixture is to be repeatedly stirred, and then left to subside, after which the liquor is to be poured off, the powder washed several times with hot water, and, lastly, dried. In this state it is fit to be converted into glass.

In the year 1742, an oil was prepared from flints by Messrs. BETTON and WELLINGTON, of Shrewsbury, for which they obtained a patent. It may be made of 4 oz. of flints calcined, pulverized, and mixed with 12 oz. of salt of tartar. These ingredients are next to be melted together in a crucible over a strong fire, and *run* into an open glass, which strongly attracts moisture from the air, and is completely soluble in water, excepting a small portion of earthy matter. This glass is then to be pulverized, and set in a cellar where it will spontaneously liquefy into an oil; which the patentees have affirmed to be efficacious in curing obstinate rheumatisms.—We doubt, however, the utility of this medicine, as there are other local remedies, more proper and efficacious in that painful complaint.—See RHEUMATISM.

FLIXWEED. See CRESS.

FLOATING LAND. See IRRIGATION.

FLOOR, in architecture, the area, or lower part of a room, which is in general covered with boards.

The best wood that can be selected for this purpose, is *yellow* deal, thoroughly seasoned; which, if well laid, will for a long time retain its colour; whereas the *white* sort, by frequent washing, becomes black, and presents a disagreeable appearance. The joints of the boards are usually made plain, so as barely to touch each other; but, as the materials are not always perfectly dry, the boards not unfrequently shrink, and the water runs through them every time they are washed, by which the ceiling underneath is injured. To remedy this inconvenience, they should always be made either with edges, so as to fold over each other about half an inch, or with what is called *dove-tails*: in the latter case, the lower edge is nailed down, and the next driven into it, so that the nails are effectually concealed.

In the habitations of the labouring classes, the floors are generally made of loam. The best materials for this purpose are two-thirds of lime, one of coal-ashes, and a small portion of clay. The whole of these ingredients is to be well tempered with water, and left to subside for a week or ten days, when it is to be worked up again. This operation should be repeated in the course of three or four days, till the mixture become smooth and glutinous, when it will be fit for use. After the ground is made perfectly level, the composition is to be laid on to the depth of two and a half, or three inches, and carefully smoothed with a trowel. The hottest season of the year is the most proper for applying this mixture, which, when completely dried, will make a most durable floor, especially for malt-houses.—See COUNTRY-HOUSES.

FLOUNDER, or *Pleuronectes flesus*, L. a fish, which abounds in all parts of the British sea, and is also found in rivers, at a considerable distance from the shore. It may be easily distinguished from plaise, or any other fish belonging to the same genus, by a row of small, but sharp spines, which surround its upper sides, and are placed at that part where the fins are united to the body: a similar row marks the side-line, and extends half way down the back. The upper part of the body is of a pale brown, which is sometimes marked with a few spots of greasy yellow.

Flounders seldom grow to any size in the rivers, few exceeding the weight of five or six pounds; they are, however, preferred to those which are caught in the sea; being much sweeter, and at the same time having a more delicate flavour.

FLOUR, the meal of wheat, rye, &c. finely ground and sifted.

We have already stated, that *corn* is the prey of a variety of insects: when converted into *flour*, it is subject to the depredations of another race of destroyers, which multiply in it so rapidly, that in a very short time they wholly consume its substance. These insects are of an oblong, slender form; their heads are provided with a kind of proboscis or snout, with which they take in their food; their body is composed of several rings. They do incalculable damage to the flour deposited in magazines for armies or other public uses; and after they have insinuated themselves into any parcel, the only method that can be adopted for saving the whole quantity is, to convert it immediately into bread.

In order to prevent such noxious vermin from breeding in flour, this valuable commodity should be kept thoroughly *dry*, as well as the barrels into which it is packed: with such precautions, if the flour be placed in a cool and airy room, it will be effectually preserved.—Sometimes, however, it happens, that though every attention be bestowed on it, flour becomes *sprit*, or damaged, and thus acquires an unpleasant flavour. This may be remedied by mixing a quantity of ground rice (in the proportion of one pound to ten of flour) with the usual quantity of yeast and water; keeping the mixture before the fire for the space of two hours; at the expiration of which time, the whole may be wrought into bread, in the common manner: thus it will be totally divested of its disagreeable flavour.—See also BAKING, vol. i. p. 150.

The proportion of flour, which a bushel of grain affords, greatly varies. A bushel of Essex wheat, Winchester measure, weighs upon an average about 60lbs., which, when ground, will yield (exclusive of the loss incurred by the grinding and drying) 45½lbs. of the flour called *seconds*, which alone is used for baking throughout the greater part of England, and which affords the most wholesome, though not the whitest bread. Beside the *seconds*, such a bushel of wheat yields 13lbs. of pollard and bran: the total loss in grinding seldom exceeds one pound and a half.

A correspondent of the Editors of the Supplement to the *Encyclopædia Britannica* (Art. BREAD), states, that he weighed 2 bushels, Winchester measure, of *white* and *red* wheat, the whole of which amounted to 122 lbs. This wheat was ground under his own inspection, and yielded 121½ lbs. of meal, so that the waste or loss in grinding the two bushels, amounted only to *half* a pound. The meal was also dressed in his presence, and produced 93½ lbs. of *seconds*, and 25½ lbs. of pollard and bran, so that the whole loss in the two bushels, both by grinding and dressing, did not exceed two pounds and a half. The bran and pollard were also dressed in a bolting mill, and produced

	lbs.	*oz.*
Sharps -	6	0
Fine Pollard -	5	8
Coarse ditto -	7	8
Broad Bran -	5	8
	24	8

One pound only was thus lost in the bolting, and if the sharps had been sifted, they would have afforded three pounds of good flour. We are inclined to think, from these and similar data, if the price of wheat were given, that of flour might be easily ascertained, and those frauds which are now practised with impunity, could be effectually prevented.

Many valuable *substitutes for flour* have already been mentioned under the head of BREAD, vol. i. p. 332, and foll. In this place, therefore, we shall only observe, that the most plentiful and the *cheapest* of these articles, in times of great scarcity, would doubtless be the CHESNUT (of which we have given an account in its alphabetical order); and likewise the different roots growing wild under fences, near ditches, and frequently on extensive commons. Of these beneficial vegetables, the attentive reader will find numerous instances recorded in the progress of this work, as well as a distinct enumeration in the pages before cited.

FLOWER, or *Flos*, the most beautiful part of plants and trees, which contains the organs of fructification.—See BOTANY, vol. i. p. 316.

From their frequent utility as medicinal drugs, as well as their external beauty, the *preservation of flowers* becomes an object of some importance. For this purpose, various methods have been devised, from which we select the following, originally suggested by Sir JOHN HILL: Let a sufficient quantity of fine sand be washed, so as completely to separate all extraneous matter. It is next to be dried, and sifted in order to cleanse it from the gross impurities that would not rise in washing. The flower or plant intended to be preserved, should then be gathered with a convenient portion of the stalk, and deposited in an earthen vessel adapted to its size. A small quantity of the sand, prepared as above directed, is next to be heated, and laid on the bottom of the vessel, so as to cover it equally, and the plant or flower placed on such sand, so as to touch no part of the vessel. More sand is then to be sifted over, that the leaves may gradually expand, without receiving any injury, till the plant or flower is covered to the depth of two inches. The vessel is now to be placed in a stove, or hot-house, heated by gradations to the 50th degree of REAUMUR, or about 144° of FAHRENHEIT), where it should stand for one, two, or more days, in proportion to the thickness or succulence of such plant, or flower. At the end of that time, the sand may be gently shaken off on a sheet of paper, and the plant carefully taken out, when it will be found in all its beauty; its shape being as elegant, and its colours as vivid, as when it was growing in a natural state.

There are some flowers, especially tulips, which require certain little operations, in order to preserve the adherence of their petals. With respect to these, it will be necessary to cut the triangular fruit that rises in the middle of the flower, previously to covering it with sand; for the petal will then remain more firmly attached to the stalk.

This method may be applied to such plants and flowers as are employed in medicine: for, though it be not always necessary to preserve their original colour and form, yet the less change they undergo, the better will they retain their natural properties. Farther, the preservation of beautiful leaves and flowers in their original shape and colour, by placing them in such a situation that they may suffer no subsequent alteration, except that from length of time or accident, is surely an object that merits the attention of every lover of Nature.—See HERBAL.

Beside this mode of preserving flowers, they may be prepared so as to retain their beauty during the winter, and even to blow at any period required. In order to succeed in in this attempt, the most perfect buds of the flowers, should be selected at the time when they are about to open. These should be cut off with a pair of scissars, leaving to each a piece of the stem about three inches in length; the end of which is immediately to be covered with Spanish wax. As soon as the buds are somewhat shrunk and wrinkled, they are to be folded up, separately, in a piece of clean dry paper, and deposited in a dry box or drawer, where they will keep without decaying.—In the winter, or whenever the flowers are required to blow, the wax is to be cut off the buds, and these should in the evening be immersed into water, in which a little nitre, or common salt, has been dissolved: if exposed to the rays of the sun, on the succeeding day, they will expand with all their original fragrance and beauty.

There are a few general remarks made by eminent botanists, on the *growth*, *enlargement*, *colours*, and *duplication of flowers*; the substance of which we shall communicate under the following heads:

1. It is an established fact, that flowers as well as fruits grow larger in the shade, and ripen and decay soonest, when exposed to the sun. Hence, likewise, the foliage or buds of plants requires more moisture for its vigorous growth than their flowers, or organs of fructification. Farther, observes Dr. Darwin, the frequent rains of our climate, are apt not only to wash off the farina from the bursting anthers, and thus to prevent the impregnation of the pistil, but also to delay the ripening of the fruit or seeds, from the want of a due evaporation of their perspirable matter, as well as from the deficiency of solar light in cloudy seasons. In another place of his admirable "*Phytologia*," this philosopher remarks that, as a superfluous supply of water is more friendly to the growth of leaf-buds, than to the generation of flower-buds, the production of seeds may be forwarded by supplying their roots with less water than usual. But when the blossoms appear, an addition of water promotes their growth, by affording nourishment, which should again be lessened, when the fruit has acquired its full size, both to promote its maturity and improve its flavour; as the saccharine matter and essential oil will thus be in a less diluted state.—Although the fruit may become sweeter and larger, when the green as well as the floral leaves continue on the tree, yet the corols with the stamens, stigmas, and nectaries (the succeeding fruit not considered) suffer, in the opinion of Dr. Darwin, no injury when both kinds of leaves are removed, as by the depredations of insects. Nay, some florists assert, that the flowers thus become stronger, producing no bulbs, as is the case with tulips and hyacinths.

2. The variegated *colours* of the petals of flowers are so beautiful, and afford such delight to the eye of the contemplative naturalist, as to deserve some investigation. It is probable that *varieties* in the colours of single flowers raised from seeds, may be generally obtained by sowing those which already possess different shades, contiguous to others of the same species; or, by bending the flowers of one colour and shaking the anther-dust over those of another. Thus Dr. Darwin supposes the beds of the corn blue-bottle, *centaurea cyanus*, acquire those beautiful shades of blue, purple, and white. As some animals change their natural colours, when transplanted in different situations of soil, a similar effect may be produced by sowing flowers in factitious composts, which considerably differ from each other with respect to vegetable nutriment, and perhaps also in their colour. Experiments on this subject, as well as on the variegation of the leaves of shrubs and trees, are however

wanting to confirm this conjecture; though the latter probably originates from soil or situation, and may be communicated by ingrafting.—The origin of *new* colours in flowers, and of variegated foliage, is imagined to arise from the want of nourishment of the soil on which they grow, compared to that assigned to them by Nature; or from a defect of moisture and of heat; a supposition countenanced by the dwarfish size of such plants, in general, and especially by the reduced stature of tulips, when their petals acquire various colours.

The immediate cause of the various colours presented by some flowers, such as poppies, has not hitherto been distinctly ascertained; but Dr. DARWIN conjectures that, as they are not variable by the obliquity with which they are seen, like those of mother-pearl, card-fish, &c. they do not depend on the thinness of their pellicle, and may, therefore, arise from the greater facility which some parts of vegetables, more than others, possess in parting with their *oxygen* (which see) when exposed to the sun's light; for all flowers are more or less blanched before they first open.

3. The origin of *double flowers* is believed to result from the luxuriant growth of the plant, in consequence of excessive nourishment, moisture, and warmth: they arise from the increase of some parts of the flower, and the consequent exclusion of others. As they present a greater blaze of colour in a small space, and continue in bloom for some weeks longer than single flowers, the method of producing them from seeds is a matter of importance. Botanists very properly term such multiplied flowers *vegetable monsters*, because they possess no stamens or pistils, and therefore can produce no seeds.—Nevertheless, they are frequently raised immediately from seeds; because flowers cultivated with more manure, moisture, and warmth than is congenial to them, not only grow larger and more vigorously, but likewise shew a tendency to become double, by having one or two supernumerary pestals in each flower, such as the stock July flower, cheiranthus, and anemone. It is still more remarkable, that this duplicature is communicated to those individual blossoms: hence florists tie a thread round such flowers, to mark them, and to collect their seeds separately, from which double or full flowers are said to be uniformly produced, if they be cultivated with additional manure, moisture, and warmth, as has been already observed.—There subsists a curious analogy, concludes Dr. DARWIN, between these vegetable monsters and those of the animal world; for a duplicature of limbs frequently attends the latter, as chickens and turkeys with four legs and four wings, and calves with two heads. In mules, also, the most important organs become deficient, so that they cannot propagate their species; exactly analogous to these full flowers which, from the same cause, produce no seed. With respect to botanic systems, it may be observed from these vegetables of exuberant growth, that the stamens and pistils are less liable to change than the corols and nectaries; consequently, that they are more proper parts for arranging plants into classes; and that on this idea LINNÆUS constructed his unrivalled system. Lastly, the calyx,

or perianth, being seldom found in a double or multiplied state, is the next part of a flower that is liable to the least changes; and may, therefore, on accurate inspection, serve to detect the genera of many duoble flowers.

With respect to the colours which may be extracted from flowers, we refer the reader to the article COLOURING MATTER, p. 38, and to the different flowers as they occur in their alphabetical order.

FLOWER-DE-LUCE, or FLAG, *Iris*, L. a genus of plants consisting of 54 species, the following three of which are natives of Britain:

1. The *pseudacorous*, WATER FLOWER-DE-LUCE, or Yellow Flag; which is perennial, grows on the banks of rivers, in marshes and wet meadows, and produces large yellow flowers in the month of July. The leaves of this plant, when fresh, are eaten by goats, and when in a dry state, by cows, but they are refused by horses and hogs.—On account of its poisonous nature to all cattle, except sheep, this vegetable ought to be carefully extirpated from meadow-grounds, and their contiguous ditches. The juice of the fresh root is very acrid, and has been found to produce plentiful evacuations from the bowels, after other powerful remedies had failed: by continuing its use, it cured an obstinate dropsy. For this purpose, it has been taken in doses of 80 drops, every second or third hour; but the degree of its acrimony is so uncertain, that it can never be generally used.—With more advantage and safety we may recommend the whole of this strongly astringent plant to the *tanner*; and its flowers to the *dyer*, for extracting a beautiful yellow; but the root, in particular, as a substitute for galls in preparing a black dye, or ink, with vitriol of iron.—Lastly, the roots of this species are stated to be an antidote to the bite of a mad-dog; and, after having been mixed with the food of some hogs that had been bitten, they escaped the disease, while others, injured by the same dog, died raving mad.

2. The *fœtida*, STINKING FLOWER-DE-LUCE, Gladwyn, or Flag, which is found on hedge-banks, and sloping grounds, particularly in the south-western counties of England; it is perennial, and produces flowers of a purplish ash-colour, which lose their smell during the night, and blow in the months of June and July.—This plant is refused by horses, sheep, and goats; its leaves are very fetid, and, when bruised, smell like rancid bacon. The juice of the roots of this, as well as the preceding species, have occasionally been used to excite sneezing; which is a dangerous practice, and has sometimes been attended with violent convulsions. It may, therefore, be more usefully employed for the destruction of bugs and other vermin.

3. The *Xiphium*, or BULBOUS-ROOTED FLOWER-DE-LUCE, or Flag, which has long been cultivated in our gardens, on account of its beauty. It has lately been found wild in the county of Worcester, and produces generally purplish-blue flowers.—M. SCHULZE informs us, in his "*Social Narratives*" (in German), that he made the following experiments with the azure-blue flowers of this neglected plant: He first bruised the flower-leaves in a marble mortar, expressed their juice, collected it in a shallow glass vessel, and, after adding

ing a small portion of finely-pulverized alum, he suffered it to dry under shade, in the open air: thus, he obtained a very beautiful *green pigment.* The flowers, however, should be gathered in dry weather, their white parts carefully separated from the coloured leaves, and the pounded alum gradually mixed with the juice, till the desired colour becomes perceptible. With this preparation, both linen and silk were dyed of a remarkably fine and permanent green colour. —Prof. Gmelin, in his German "*Technical Chemistry,*" gives the following recipe for preparing a lively *green water-colour*: Take equal quantities of the expressed juice of the bulbous-rooted flag and rue, and add such a proportion of a strong solution of alum, as is required to produce the colour.

Flowering Fern: See Osmund-Royal.

FLUELLIN, the Sharp-pointed, or *Antirrhinum Elatine*, L. is an indigenous annual plant, growing in corn-fields, and flowering from July to September.—The expressed juice of this plant has been highly recommended as an aperient, resolvent, and vulnerary; which properties an infusion of it possesses, though in an inferior degree.—An ointment is prepared from this juice, which was formerly in great repute as a remedy in leprous, scrophulous, and cancerous cases. It is at present employed only by empirics, both male and female, who pretend to cure with it cancers of every description.

FLUMMERY, a kind of jelly made of oatmeal, in the following manner: Steep three large tablespoonfuls of finely ground oatmeal for 24 hours in two quarts of pure water, then pour off the clear fluid, and replace it by three pints of fresh water; strain it through a fine hair sieve, add to it two spoonfuls of orange-flower water, and one of sugar; boil the whole to the consistence of a hasty pudding, stirring it continually while boiling, till it become perfectly smooth. This preparation affords a grateful and nutritive breakfast to persons liable to costiveness, in consequence of a sedentary life.

FLUTE, the German, a musical instrument of a well known construction.

Although playing the flute is on the Continent more generally practised than in Britain, yet we think it useful to observe, that this exercise is by no means compatible with either *young* or *weak* lungs. Indeed, all *wind-instruments* are in many respects objectionable, because, after blowing forcibly, a large portion of air is suddenly inhaled, and afterwards partially expelled from the lungs, so that they are by this debilitating action continually expanded and relaxed, in a manner very different from that which Nature pursues in the process of respiration.—See farther Wind-instruments.

FLUX, a disorder to which sheep are subject, when those useful animals, after having been kept on too short an allowance, suddenly come to their full feed. It is also sometimes occasioned by their eating the Fetid Chamomile, or May-weed, *Anthemis cotula*, L.—This disease, however, is not attended with any dangerous consequences, and generally disappears in the course of a few days, especially in dry weather. But, if it continue longer than a week, some sweet and well-dried hay should be given them, and a decoction of clover-flowers, with the addition of a little barley-meal; and neither allowing them any salt, nor to feed upon saline plants near the coast, during their convalescent state.

FLUX, or SAP-FLOW, *Fluxus umbilicalis,* a disease frequently occurring in plants and trees, when the alburnum, or sap-wood, is wounded during the spring; and which consists of a saccharine, mucilaginous fluid, resembling honey-dew. This affection occasions great trouble, especially when vines in hot-houses are pruned too late in the season; for the whole branch is liable to bleed to death, in consequence of the loss of the sap, which ought to supply the young buds with nutriment, and expand their foliage.

There are some perennial plants, such as the cow-parsley, or *Heracleum sphondylium,* L. the roots of which, if the stems be severely wounded, or entirely cut off, when they have attained a certain height, are liable to decay in consequence of this flux, or loss of the umbilical fluid.—Hence Dr. DARWIN observes, it has been recommended to mow down, early in the spring, thistles, and such other noxious weeds as are troublesome, on account of their rapid increase; because many of them will perish, and the rest will be considerably weakened by the great discharge of sap that flows from their wounds at that season.

With respect to *trees,* there is another period of sap-flow, that occurs when the new buds are forming, after Midsummer. It is therefore very injurious to wound trees at that period; and, as their vegetation is thus endangered, different applications have been recommended by gardeners. Dr. DARWIN is of opinion, that a bit of sponge, if bound upon the end of the cut branch, or upon the wound, by means of some elastic bandage, will be the most certain remedy to save them; or, a wire may be substituted for the sponge, if twisted so tightly round the end of the maimed branch, as to check the circulation of the juices, and consequently to destroy the part above the ligature.

FLY, or *Musca,* L. an order of insects divided into several genera, of which we shall notice only those species that are more immediately connected with agriculture and domestic economy.

1. The *Dolphin,* or *Bean-fly,* See vol. i. p. 205.

2. The *Corn,* or *Hessian-fly,* a native of the Landgravate Hesse, whence it has received its name. This insect is particularly destructive to wheat-corn, in which it deposits its eggs close to the ground, while growing.—When the young vermin are hatched, they continue for some time in a worm-state, feeding on the tender part of the stalk, the growth of which is thus effectually checked. The Hessian-fly committed great depredations in the Eastern counties of England, several years since; and, in the year 1787, did incalculable damage in the provinces of Pennsylvania and Maryland, in America. The only efficacious remedy hitherto discovered, consists in facilitating the vigorous growth of the plants, by properly manuring and cultivating the soil; which practice, as it will admit of late sowing, will greatly retard their progress.

3. The *Turnip-fly,* which not only infests turnips, but also cabbages, flax, and other useful vege-

tables. In order to prevent the depredations of this insect, it has been recommended to mix three pounds of turnip-seed with one ounce of flour of sulphur in a glazed earthen pot, which should be closely covered: after standing twenty-four hours, another ounce of sulphur should be added, and the same quantity after forty-eight hours, so as to employ three ounces of this powder to three pounds of the seed, carefully stirring the whole every time the vessel is opened, with a smooth piece of wood or ladle, that the seed may be thoroughly impregnated with the sulphur. It is then to be sown on an acre of ground, in the usual manner, where it will effectually keep off the insect till the third or fourth seeding-leaf is formed, which will acquire a bitterish taste, and thus be secured from the depredations of the fly.—Another remedy is, to strew tobacco-dust over the land; and in some counties the seeds are steeped in soot and water for several hours previously to being sown, by which they acquire such a degree of bitterness, as to screen them completely against the ravages of this noxious insect.

There is a kind of fly which infests orchards, perforating the leaves of the trees, especially quinces; and which, though the foliage is afterwards renewed, occasions irreparable injury to the fruit. With a view to prevent these depredations, it has been recommended to mix a small quantity of diluted honey with some arsenic, which composition attracts the insects, and consequently destroys them. This remedy may, with due precaution, also be employed in houses where flies abound; and as flies are liable to great thirst, if a weak solution of arsenic with a little sugar be placed on a plate, in windows or on chimney-pieces, they will drink it eagerly, and thus meet with almost immediate destruction.

As, however, arsenical remedies are liable to produce dangerous accidents, we shall communicate other means which are less hazardous, and equally efficacious, for exterminating flies. If a room be swarming with these noisome insects, the most easy mode of expelling them is, simply, by fumigating the apartment with the dried leaves of the gourd (*Cucurbita*, L.) the smoke of which instantly expels them, if the window be opened, or suffocates them in a close room; but, in the latter case, no person should remain within doors, as these narcotic fumes are apt to occasion the head-ach. In situations where this expedient cannot be conveniently adopted, Professor TROMSDORF has furnished us with an excellent remedy, that neither endangers the lives of children, nor is attended with much expence or trouble. Take two drams of the extract of quassia, dissolve it in half a pint of boiling water, add a little syrup or sugar, and pour the mixture on plates: to this enticing food flies are extremely partial; and it is to them not less fatal than solutions of arsenic.

FLY-BLOWN, a term expressive of that corruption of flesh-meat, or any animal food, which is occasioned by flies depositing their eggs on its surface, where they are subsequently bred into maggots.—In the warm days of summer, meat is very liable to be thus tainted and rendered unfit for use, especially if it be kept in a close or damp place, which is not sufficiently ventilated. The easiest method of preventing such damage, is that of suspending the joints in a *meat-safe*, or a wooden frame surrounded by close wires, so that the flies may be completely excluded, and the air still allowed to perflate the whole apparatus. An open and cool situation, however, ought to be chosen for this repository.—Those families which are not provided with this useful domestic contrivance, may occasionally preserve joints of meat for several days, even in summer, by wrapping them in clean linen cloths, previously moistened with good white-wine vinegar, placing them in an earthen pan, and changing the cloth once or twice a day in warm weather.—See also FLESH-MEAT.

FLY, the CATCH, or CAMPION, *Silene*, L. a numerous genus of plants amounting to 63 species, eleven of which are indigenous. None of these have hitherto been employed to any other useful purpose than that of serving as pasturage for cattle. There is, however, one remarkable species of this plant, namely, the *nutans*, or NOTTINGHAM CATCH-FLY, that grows on dry or hilly pastures and walls, produces *root-leaves* on short leaf-stalks, forming a close turf; and bears white flowers in June or July, which are eagerly visited by bees, and might, therefore, be cultivated with advantage, in situations where these industrious creatures are reared.

FLY, the SPANISH, usually called by the plural name of *cantharides*, but properly speaking, is a chafer of a shining green colour, a blueish shade, and emitting an unpleasant narcotic odour. This insect is the *Meloë vesicatorious*, L. which preys on the leaves of the common lilac, *Syringa vulgaris*, L. privet, *Ligustrum vulgare*, L. common ash, *Fraxinus excelsior*, L. and other trees, though it seldom appears in our climate.—Having already stated various substitutes for this foreign drug, under the head of BLISTER, and cautioned the reader against its indiscriminate application, we shall only add, that the internal use of this medicine, even in very small doses, is extremely precarious, and ought, therefore, to be abandoned.—Externally, the tincture of Spanish fly has often been employed with advantage as a *rubefacient*, by merely rubbing indolent swellings; or, the powder, as an ingredient in plasters, which ought, however, to contain but a very small portion of this powerful stimulant.

FLY-STRUCK, a disorder peculiar to sheep, which is occasioned by a fly that settles and deposits its eggs on them, and very materially injures the quality of the fleece.

In order to remove this malady, it has been recommended to cut off the wool, as far as it is infected, and to pour a few drops of the following mixture in a circle round the maggots, produced from the flies, to prevent their escape.—Dissolve half an ounce of corrosive sublimate in 2 quarts of rain-water, to which a gill ($\frac{1}{4}$ of a pint) of spirits of turpentine should be added. When this compound is poured on the back of the diseased animal, in the manner above directed, the shepherd ought to drop a little among the maggots, and rub them about with his finger: in consequence of which, they will be immediately destroyed.—Another remedy, after clipping the wool, is to rub the parts infected with finely ly powdered lime, or wood-ashes, and afterwards to anoint them with currier's oil, which will heal the wounds, and secure the animals from being stricken again.

FOAL, or COLT and FILLY, the young of a horse. See COLT.

FODDER, denotes any kind of dry food provided for horses, or other cattle: it is more particularly applied to hay and straw.

Having already specified those vegetables which may be employed with the greatest advantage in the feeding of oxen, cows, bulls, &c. we shall here offer only a few observations supplementary to those stated under the article CATTLE.

The saving of expence in obtaining manure, is an object of great importance to farmers; but there are few, comparatively speaking, who pay a due regard to this circumstance; and, by disposing of their hard straw (such as that of barley, rye, &c.) for the purpose of thatching, they are under the necessity of purchasing dung, which expence might be completely obviated, by employing such straw in feeding their oxen and other *dry* cattle.—See STRAW-CUTTER.

Considerable advantages might likewise be derived from the use of *compressed fodder,* invented by Mr. LAWSON, of Rotherhithe-street, London. This consists of the haulms of peas, beans, potatoes, and the tops of carrots, which, after being cut off and dried, are mixed with certain portions of bruised corn, hay, fir-tops, bran, and broken oil-cake, and then formed into a stack, with clover, either in layers, or intermingled with that plant. To these articles, Mr. LAWSON directs a quantity of straw to be added, in order to prevent the compressed food from becoming mouldy, together with a small portion of common salt, which will both preserve and improve the fodder. The saving that might arise from the use of such provender, Mr. LAWSON estimates at not less than *one-eighth* part of the corn and herbage now consumed in racks, and given in an unbroken state, by which means the greater part of its most nutritious properties is, to many kinds of cattle, totally lost: whereas, by breaking the corn and other ingredients, no part can possibly remain in an undigested state, such as is frequently evident in horses fed with whole corn, which they void with their dung, being as perfect and entire as when it was first taken from the bin. Facts, like these, require no farther exposition, and we earnestly recommend them to the attention of every intelligent farmer and grazier.

FOG, or MIST, a meteor consisting of gross vapours floating near the surface of the earth.

Fogs have a considerable influence on the winter. In the summer of 1783, an uncommon fog prevailed all over Europe, and great part of North America. It was dry, of a permanent nature, and the rays of the sun had but little effect in dissipating it, which they easily do in moist fogs arising from water. The effect of the rays in heating the earth was exceedingly diminished: hence its surface was frozen early, the first snows remained on it undissolved, and received continual additions; the air was more chilled, and intensely cold, and the winter of 1783 and 1784 was exceedingly severe.

The spring fogs are most detrimental to such young fruit, and other trees, as are planted in low situations;

tuations; because they moisten the young shoots, and thus render them more liable to the injuries of the frosty nights succeeding them, but which they escape when placed in more elevated situations.—These fogs are converted into rime during the night, which thus falls on the trees, and is in some circumstances believed to shelter the vegetables by the heat it emits at the moment of its freezing: hence *black frosts*, which are not accompanied with rime, are said to be more prejudicial. But Dr. DARWIN remarks, that where dew or mist descends on vegetables, before the act of freezing commences, and is partly absorbed by them, they become more succulent, and are thus destroyed by their fluids being converted into ice. To obviate this inconvenience, he proposes to make temporary sheds in the walls of gardens, projecting eight inches from the walls, and to be held by hooks that may be easily removed, when no more frosts are to be apprehended. Dr. DARWIN successfully tried this expedient with an apricot-tree, which was preserved uninjured, either by the fog, or the frosts that followed it, during the vernal nights.

FOMENTATION, in the art healing, signifies the external application of a fluid in cases of swellings, &c. as warm as the patient can bear it, and in the following manner: Two pieces of flannel are dipt into the heated liquor, one of which is expeditiously wrung dry, and thus immediately applied to the part affected. As soon as it begins to grow cool, the first is removed, and the other instantly substituted, in order to keep those parts constantly supplied with the warm flannels. This operation is continued for 15 or 20 minutes, and is repeated two or three times in the course of the day, as circumstances may require.

The design of fomentations may be fully answered, by the application of warm water alone, unless discutients or antiseptics are required; in which cases, such ingredients must be employed as are calculated to effect that purpose.

The degree of heat should on no account exceed that of producing an agreeable sensation; for too great heat is attended with effects, very different from those which are expected from the use of fomentations.

FOOD, generally speaking, denotes those alimentary substances which are taken into the stomach, whether fluid or solid; but it is usually confined to the latter kind:—of the former we have already spoken in the article DRINK.

In the early ages of the world, mankind were supported by acorns, berries, wild roots, and such other vegetables as the earth spontaneously produces. In succeeding centuries, as civilization advanced, luxury also made rapid progress; men had recourse to animals, as well as to vegetables artificially raised for their sustenance; and, in still later ages, the art of preparing food has been brought perhaps to the highest degree of perfection, of which it is susceptible.

Though originally designed to be a blessing to mankind, as well as their support, food may, in many cases, be justly considered as a curse: for we do not hesitate to affirm, that the injudicious conduct of parents and nurses, during infancy, and the early years of childhood, lays the foundation of those numerous diseases, which, at a maturer age arise from indigestion, and have, in many families, become hereditary.

The aliment of children ought to be adapted to their age, and the strength of their digestive powers. Hence they ought by no means to be fed immoderately, and promiscuously with every kind of food: as, by this indulgence, the first passages are distended, and their stomachs gradually acquire an unnatural craving for victuals, before the preceding meal is properly assimilated. Such conduct is particularly injurious during the first year of their age: for, when their stomachs become more vigorous, they may be enabled, by slow degrees, to digest different kinds of victuals, the nature and properties of which are extremely opposite; though excess in quantity is always hurtful. No food whatever, that has been prepared for many hours, should be given to children, especially after being *warmed up*, as it generates flatulence, heart-burn, costiveness, and a variety of disorders which are equally painful and difficult to remove. Sudden changes from liquid to solid food are equally dangerous: one kind of aliment only, should be given at each meal, in moderate portions; and not a multiplicity of incongruous mixtures, in immediate succession, such as broth or soup, meat boiled or roasted, after taking milk, fruit, &c.

All stimulating dishes, prepared for adults, as well as beer, wine, spices, coffee, and other heating liquors, should be carefully withheld from children; as they often occasion the most afflictive complaints, for instance, eructations, vomiting, spasms, and convulsions, especially during dentition; and, if the hapless victims of indulgence survive that period, they become liable to other tormenting diseases, the most frequent of which are the scurvy, scrophula, and consumption.

There is another abuse in the feeding of children, which cannot be too seriously reprehended, namely, to introduce chewed victuals into their mouth, a practice equally disgusting and unwholesome.—Young and healthy mothers, it has been said, may safely perform this office for their children: but, in such case, it is requisite that the parent be in a complete state of health, that she be provided with sound teeth, and rinse her mouth previously with pure water. Under these circumstances, she may venture to perform mastication, though it would be more advisable to relinquish this practice, and to give infants such food only as they are able to chew and digest.

Having already treated on the food of adults, under the article DIET, and on the different modes of preparing it, under that of COOKING, we have but a few remarks to add for the information of the reader.

Vegetables are, with a few exceptions, more difficult of digestion than *animal food*; but a due proportion of both, with the addition of acids, during the summer months, is alike grateful and conducive to health. On the whole, the flesh of young quadrupeds is less nutritive than after they have attained a proper age; though it will, in general, be more easily converted into alimentary matter. In a *salted* state, meat not only loses a considerable part of its gelatinous and spirituous particles, but it likewise becomes oppressive to the digestive organ, and imparts a degree of acrimony to the human fluids, which has a remarkable tendency to generate putrid diseases, such as the scurvy of mariners.—Hence it would be a desirable object to ascertain, by accurate experiments, whether beef, pork, &c. might not be kept fresh at sea for many months, merely by burying it in charcoal-powder, of which it could be easily divested by proper ablution. Such is our decided opinion, and we venture to recommend this important subject to the farther researches of patriotic inquirers.

With respect to the quantity of food, there is one general rule, which ought never to be disregarded; namely, to cease eating, when the first cravings of appetite are satisfied, so as to renovate the waste which the body has apparently sustained. By a strict adherence to this principle, many of those distressing complaints arising from intemperance, might be effectually obviated; and our fashionable *watering-places* would not be so frequently crowded by the victims of luxury.

Food of Plants, an expression in agriculture and gardening, by which is understood whatever tends to increase the growth, or affords nourishment to vegetable productions.

The proper choice and distribution of this food, in such manner as to ensure the greatest advantage to vegetation, is an object deserving the most attentive exertion of every skilful husbandman.—The component parts of the nourishment of plants are supposed to be *air*, *heat*, *water*, *earth*, and *nitre*; but it is by no means ascertained, which of these ingredients principally contributes to their growth and reproduction.

Various opinions have been held respecting the existence of an *aërial acid spirit*; but, from the late discoveries in chemistry, this invisible agent appears to be no other than what is now termed *oxygen gas*, or the acidifying principle, by the powerful influence of which even iron is oxydated, or converted into rust: and, as this vital gas is an essential constituent of the atmosphere, all plants necessarily partake of its animating properties. Thus *nitre* is said to nourish them; because it contains a large portion of oxygen; though it is certain that saltpetre only prepares other substances to effect that purpose: thus, if nitre, in a solid or liquid state, be applied to the root of a plant, it will destroy it; but if it be placed at a distance, it attenuates, and decomposes the viscous and naturally pernicious matters contained in the earth, so as to render them fit for supplying vegetables with nutriment.

Water contributes to the growth of plants in a very material degree: hence arose the art of floating land in dry seasons, without which vegetables would perish for want of moisture.—See Irrigation.

Air, on account of its elasticity, is absolutely necessary to the increment of vegetables; *warmth* is of equal importance, because no plant can thrive without some degree of heat. But, doubtless, the chief article is *earth*; which, being prepared by the nitrous, and other volatile salts, such as are generated in dung, not less than by water and air, is assimilated to the nature of plants; constitutes a part of them; and is inseparable from them: but, if water, air, and heat, be taken away, the plant will still exist; though, from the want of those elements, it has ceased to vegetate.

The excess of nitre, air, water, and heat, however, is a proof that these articles do not constitute the proper, or only food of plants. Thus, too great a proportion of nitre, or other salts, corrodes, and deprives them of vegetable life; too much water drowns them; too great a degree of air dries their roots; and too much heat shrivels and burns them; but there cannot be too large a proportion of *earth*, unless the plant be too deeply buried under it, so as to exclude the salutary influence of the other elements; in which case it must necessarily perish.

Many experiments have lately been made with factitious gases, in order to ascertain whether the growth of plants might be forwarded by such artificial agents; but, though some of these elastic airs, such as oxygen, have been found remarkably to promote vegetation, yet the expence and trouble, which these applications would occasion in the great way, will ever be insuperable objections to their general introduction.—From recent attempts to fertilize and stimulate the soil itself, as the growing medium, with chemical solutions, it appears that water very slightly impregnated with *camphor*, or, according to others, with the *phosphoric acid* (which see), has produced uncommon effects on the earth of vegetables, and accelerated their rapid growth in a very evident manner. Farther experiments, however, will decide how far such means are practicable, and whether the nature of plants thus forced, is materially changed or affected.

FOOLS-PARSLEY, or LESSER HEMLOCK, *Aethusa cynapium*, L. an indigenous plant, growing in corn-fields and kitchen-gardens, and flowering in the months of August and September.

This noxious weed greatly resembles the common parsley, for which it is sometimes mistaken; but may be easily distinguished by its glossy surface, and total want of odour: when eaten among other plants, it occasions vomiting, violent colic, and other painful symptoms.—Such accidents, however, might be easily avoided, by cultivating only the curled-leaved parsley, *Apium graveolens*, L. in our gardens.—The fools-parsley is eaten by horses, cows, sheep, and goats; but is pernicious to sheep.

FOOT, that part of the body on which animals stand and walk.

The principal cause of the lameness and distortion observable among many children, especially of the poorer class, is owing to an improper management of them, during their infancy. Instead of being carried on the nurses' arms, in a posture which contracts and palsies the lower extremities, they ought to be supported in such a direction that the legs and feet may be at liberty. Nor should they be confined too early in narrow shoes, with a view to render their feet small and *taper*: those necessary parts of our dress ought to be wide enough to allow sufficient room for motion, and might be fastened with strings, which are preferable to buckles. It will also be proper to adapt the shoes to the form of each foot, by means of separate lasts; in the same manner as those of the fashionable classes are made at present. A kind of half-boots, however, such as may be laced above the ancles, are superior to shoes, as they not only have the advantage of fitting the leg, but are likewise not easily trodden down at the heels; besides, children are enabled to walk more firmly in them than in shoes.

With respect to the feet of adults, we would recommend always to adapt the shoe to their size and shape, and utterly to disregard the prevalence of an absurd fashion, which is often attended with inconvenience. Hence arise those painful excrescences, *corns*, concerning the cure of which we have already treated. To the same cause must be ascribed the growing of the nails into the flesh, which is attended with excruciating pains.

Bathing the feet and legs, over the knees, in warm water, is of great service, especially after returning from a long journey. When employed as an assistant to medicine, in certain diseases, it is of considerable advantage: and, if it be of a proper temperature, not exceeding 98°, it may be considered as a safe cordial, by which the circulation of the fluids can be excited, or a gentle and salutary fever induced. Bathing of the feet, therefore, is incomparably safer than the generality of cordials and sudorifics, as its effects may be suspended at pleasure.

Blistered feet, or vesicles containing water, may be prevented in the hot days of summer, by anointing the soles of the feet with venison tallow, and wearing worsted socks. We know an instance of a man, who at the age of eighty years travelled on foot, in warm weather, from the vicinity of Durham to the west of Scotland, a distance of 200 miles, in five days, without experiencing any inconvenience: on inquiry, he declared that he made use of no other expedient than that of rubbing the feet of clean woollen stockings, every evening, with spirit or oil of turpentine; suffering the moisture to evaporate during the night; and wearing them on the following day. We believe, however, that *vitriolic æther*, though more expensive, would be better adapted to the purpose. But, when the feet are once blistered, it is advisable to open the vesicles without delay, by the point of a lancet, or needle; to express the water; and rub the parts with the fat of venison, or mutton-suet taken from the kidneys.

Those parents whose children are afflicted with club-feet, or other deformities of the lower parts, we would recommend to peruse Mr. SHELDRAKE's "*Practical Essay on the Club-foot*," &c. (8vo. pp. 214. 7s. Murray and Co. 1798); where they will find much information perspicuously arranged, and illustrated by engravings.—See CHILBLAIN and SHOE.

FOOT-HALT, a disorder peculiar to sheep, and which is occasioned by an insect resembling a worm, two, three, and sometimes four inches in length. The first appearance of this malady is manifest by the lameness of the animal; a symptom which increases to so high a degree, as to prevent it from grazing. In consequence of pain, and want of food, the sheep lingers till at length it falls a victim to the disease, unless the worm be timely extracted; an operation that may be easily performed.

As soon as the animal begins to limp, the lame foot should be examined between the close of the claws, where the skin will be found perforated with a hole, through which the insect has worked itself a passage upwards, between the external membranes and the bone. In order to extract the worm, the claws should be moved in contrary directions, for a considerable time, till the insect gradually makes its way to the surface. This simple operation will be fully efficient, without any other application; and it is certainly preferable to drawing the worm out; as in the latter case there is always danger of its breaking off, and rotting in the sheep's leg, which would materially injure the animal.

The *foot-halt* occurs more frequently in wet than in dry seasons; generally in the spring and autumn, but seldom in the summer and winter. Sheep that are pastured in high, healthy grounds, are less liable to be attacked by this insect, than those which graze in low meadows, or marshy soils.

FOOT-ROT, a disease to which sheep are subject, and which is said to be contagious.

The first symptom of the disorder is manifest, when the animal affected begins to limp; though no injury will be perceptible on examining the foot, which is extremely hot.

The second stage of the distemper is a yellowish-white spot, that appears in the cleft of the hoof, spreads gradually, and becomes livid; destroying the hair, which in sound animals covers the foot. At this period, the diseased part acquires a disagreeable smell, and the lameness increases.

In the third stage, the malady sinks into the frog of the foot; the shell of the hoof loosens, and the frog is filled with fetid matter, that oozes out when pressed by the hand: a small tumor sometimes breaks out in the front of the leg, about one inch above the hoof, which, however, is easily dispersed.

In the last stage, the foot is so completely mortified by the cancerous humour corroding every part of it, as to become incurable; in which case, the skin is the only valuable part of the animal.

Through these different periods, the sheep affected retain their appetite, and feed apparently as well as when in health; but they very soon fall away, and continue to decline, till they have lost all their fat.—Notwithstanding their rapid decay, at the end of the second and the commencement of the third stage, they are so eager for food, that they even crawl on their knees for sustenance.

For the cure of this infectious disorder, different remedies have been prescribed; from which we select the following: the first was invented by the late Mr. BAKEWELL, the other by Mr. GEORGE CULLEY, of Fenton, Northumberland.

1. Take 3 oz. of verdigrease; of vitriol, and common alum, 4 oz. each; white mercury 1½ oz. and white copperas 1 oz. The whole is to be finely pulverized, and dissolved in a quart of white-wine vinegar.

2. Let 4 oz. of the best honey; 2 oz. of burnt alum reduced to powder, and ½ lb. of pulverized Armenian bole, be mixed in as much train or fish oil as will convert these ingredients into the consistence of salve: the honey ought first to be gradually dissolved, when the Armenian bole should be properly stirred in, after which the alum and train oil are to be added.

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The parts affected may be rubbed with either of these compositions; unless the distemper has become incurable; but, in the opinion of Mr. ARTHUR YOUNG (from the 21st vol. of whose *Annals* we have abstracted these recipes), the *red salve* of Mr. CULLEY, is more efficacious than Mr. BAKEWELL's liquid, having cured one or two diseased feet, where the latter had failed: yet Mr. Y. always employs the liquid, previously to anointing the animals with the salve.

This malady, in general, arises from long grass in wet seasons; but, if sheep be suffered to lie upon their own dung, a fermentation will take place, and occasion either the *foot-rot*, or the *foot-halt*: to prevent which fatal disorders, those animals should be well littered, and kept with a strict attention to cleanliness.

FORCING, in horticulture, is the art of producing ripe fruits from trees, before their natural season.

Although by no means inclined to encourage this artificial practice, as fruit thus raised is neither savoury nor wholesome, yet we shall insert the method generally adopted to effect that purpose, for the gratification of the curious, more than for its real utility.

A wall should be erected 10 feet in height; a border marked out on its south-side, about 4 feet wide; and stakes fastened into the ground along the edge of the border, at the distance of 4 inches. These are intended for the support of the glass lights (or, with less expence, frames covered with oiled paper), which are to be placed in a sloping direction towards the wall, to shelter the fruit, as occasion may require: at each end, a door is to be so constructed that it may be opened either way, according to the course of the wind. The frame ought to be moveable; because, after a tree has been covered one year, the former should be removed to another; observing that each fruit-tree be forced only once in three years: by this arrangement, they will be more durable and productive.

Previously to applying the dung to the wall, it should be thrown together in a heap, for five or six days, that it may thoroughly ferment; thus prepared, it ought to be laid four feet thick at the base of the wall; and continued upwards in a sloping direction, till it is about two feet in thickness, within a few inches from the top of the wall; but, as it sinks, more dung should be added, for the first heat will only swell the blossom-buds. The proper season for laying it, is about the latter end of November; and, for ripening cherries, three changes of dung will be sufficient to produce very fine fruit in the month of February.—This method of forcing, however, being often very expensive and troublesome, *tanner's-waste* is now almost universally employed for producing artificial heat, by enclosing it to the depth of three or four feet, within the walls of a hot-house.

Early and late ripening fruits should never be placed together; because the requisite degree of heat for forcing the latter, would be very prejudicial to the former, after they have produced fruit. Glass, or oiled paper frames, are of considerable service for covering trees; but they should occasionally be removed, to admit the benefit of gentle showers; and the doors at the ends may, in warm weather, either be left entirely open, or one of them only closed. A mat should be suspended before the doors, to protect the trees from night frosts.

The fruit-trees most proper for this management are, the avant, or small white nutmeg, the Albemarle, the early Newington, and the brown nutmeg-peaches; Mr. Fairchild's early, the elrugo, and Newington nectarines; the masculine apricot; and the May-duke and May-cherry. —With respect to vines, the white and black sweet-water grapes will thrive most favourably: for early gooseberries, the Dutch-white, the Dutch early green, and the walnut-gooseberry, are the best sorts; and for currants, the large Dutch-white, as well as the red currants, are equally prosperous.—See Hot-houses.

Forcing of *Wine*. See Clarification.

FOREST, generally speaking, signifies a large tract of land, covered with trees.

The principal forests in this country are those of Sherwood, Windsor, the New Forest, that of Dean, on the north of the river Severn, and Epping-forest, in the county of Essex. There are, besides, several smaller forests, the total extent of which, together with those just enumerated, amounts to about 300,000 acres. The utility of forests, to a commercial nation, is very great; as, by the quantity of timber they afford, a considerable expence may be saved, which must otherwise be incurred by the importation of materials for ship-building.

Independently of these considerations, forests of a moderate extent are a national ornament, especially if they do not occupy such lands as could be more usefully employed in agriculture. Formerly, England abounded with woods, and was celebrated for its lofty and majestic oak, which, however, of late years has become scarce. On the contrary, various large tracts of uncultivated ground might now be advantageously planted with larch, fir, and other trees; but, as these expensive undertakings are beyond the ability of private individuals, it is to be hoped that the Commissioners of the Land Revenue will be able speedily to carry so patriotic a measure into effect.—See Plantation.

FORE-STALLING is the buying of, or bargaining for, corn, cattle, or other merchandize, in its passage to fairs, or markets, for sale, with an intent to dispose of them again at an advanced price.

The punishment for this offence, on conviction by two or more witnesses, is, for the *first* time, two months imprisonment, and forfeiture of the goods, or their value; for the *second*, the offender incurs an imprisonment of six months, and loses double the value of the articles; and, for the *third* offence, he is liable to imprisonment during the King's pleasure; to a forfeiture of all his property; and is to be sentenced to stand in the pillory.

Severe, however, as these regulations appear, they have hitherto not been attended with the desired effect. Notwithstanding all the arguments and invectives that have been employed against this growing evil, in printed works, and in the courts of justice, we are persuaded that it will never be crushed, till national councils adopt proper and effectual measures for *preventing* this iniquitous practice. Nay, others assert, that the root of the mischief is intimately connected with the *landed interest,* as well as with the numerous *paper banks* which infest both town and country.

Such of our readers as have leisure, or inclination, to peruse a few late tracts on this important subject, we shall refer to Mr. GIRDLER's "*Observations on the pernicious consequences of Regrating, Forestalling, and Ingrossing,* &c. (8vo. 6s. Seeley, 1800), where they will find considerable information, blended with reflections animated by benevolence and public spirit. It is but justice to observe, that the same author has published an abridgment of his work in 12mo. price 2s.—Mr. MORRIS's "*Short Inquiry into the nature of Monopoly and Forestalling,*" (8vo. 1s. Cadell, 1800), contains a temperate discussion of this interesting topic.—To these we shall add Mr. ILLINGWORTH's "*Inquiry into the Laws, ancient and modern, respecting Forestalling, Regrating, and Ingrossing,*" &c. (8vo. 7s. Brooke, 1800), which comprehends a full investigation of the subject, according to the laws of this country; and is alike calculated to inform the lawyer, the antiquary, and those who are in search of truth.

FOSSIL-ALKALI, is thus called to distinguish it from the *vegetable alkali*; as the former is found in a pure state, in the bowels of the earth; whereas the latter is prepared from various plants.

Fossil, or mineral, alkali abounds chiefly in Egypt, Tripoli in Barbary, Hungary, several Russian Provinces, and some parts of Asia; but it has seldom been found in the western countries of Europe, except in the vicinity of volcanoes, or in mineral waters; and in these it exists only in very small portions.

The chief source of this alkali is the water of the ocean. It forms the basis of sea-salt; and, as it is an article of the greatest utility, different methods of extracting it have lately been invented.

In August, 1781, a patent was granted to Mr. ALEX. FORDYCE, for his new processes, by which the alkali contained in sea-salt, rock-salt, salt-springs, salt-cake, Glauber's-salt, and vitriolated tartar, may be separated from the marine or vitriolic acids.—He first converts salt-water, &c. into Glauber's salt, by the application of vitriolic acid, or of any substance containing the latter. This salt is then to be mixed with a double quantity of lime, chalk, or any other calcareous earth, or iron, or with any substance containing that metal. The whole is to be placed together in a vault, or other reservoir, secured from the rain, till it is completely decomposed, when the alkali is to be extracted by dissolving it in water, and evaporating it to dryness. Or, the patentee employs 60lbs. of Glauber's salt, or vitriolated tartar; 10lbs. of charcoal, or any other substance capable of bearing heat, and containing the inflammable principle; and 10lbs. of iron: these ingredients are pounded together, and thrown into forty gallons of water; where they are suffered to digest for twenty-four hours. The clear solution is then to be separated; and, by evaporating, filtering, and crystallizing, it is rendered fit for use.

Another patent was granted in March 1789, to Mr. ANTHONY BOURBOULON de BONEUIL, of Liverpool, for his invention of an apparatus on a new construction, and certain new processes for the making of fossil alkali, which is said to be equal to that extracted from the best barilla.—As, however, his specification is so complex, that it could not be understood without the aid of an engraving; and, as the patent is not expired, we refer the reader to the 4th vol. of the "*Repertory of Arts and Manufactures.*"

The last process which merits our attention, is that of the Earl of DUNDONALD, for obtaining mineral or fossil, and vegetable alkali, from neutral salts composed of those alkalies and an acid; or from the solutions of those salts, whence several articles are disengaged or formed, that may be collected and applied to various useful purposes. For these different inventions, his Lordship obtained a patent in 1795.

1. The most important of the new processes, is that of making Glauber's salt, or sulphat of soda, which is one of those neutral salts, consisting of an alkali and an acid, from which an alkaline salt is to be procured. Thus, several other articles, such as spirit of salt, sal ammoniac, and an iron earth mixed with clay, as a pigment, are formed, or disengaged, and may be collected: 2. Glauber's salt is decomposed, forming mineral alkali, or *soda*, either in a mild or caustic state: 3. Vitriolated tartar is prepared by decomposing the muriat of pot-ash; and 4. This preparation is converted into either a vegetable alkaline hepar, or mild or caustic vegetable alkali. The salts and other substances resulting from these chemical operations, may be applied to various purposes, particularly for decomposing soda from Glauber's salt.

As the principal article for which Lord DUNDONALD has established manufactories, appears to be the SODA now generally sold in the shops, we shall, in the alphabetical series, describe its manifold uses, and content ourselves at present with giving a summary of the inventions claimed by the noble patentee: namely, that sea-salt is decomposed by alum, by vitriol of iron, and Epsom-salt, with the acid of heat, when a due proportion of clay, or a clayey iron earth is mixed with the salts submitted to the operation;—that sea-salt is also decomposed by Epsom-salt with the aid of heat, and without the intervention of clay;—lastly, that it may likewise be reduced by sulphat of lime, or gypsum, with the aid of heat, when a due proportion of clay, containing much iron, is mixed with the sea-salt and gypsum.

FOSSIL-COAL, a species of pit-coal found in various parts of England.—See COAL.

In December 1792, a patent was granted to Mr. JOHN BARBER, of Attleborough, Warwickshire, for a method of smelting and purifying fossil-coal, iron-stone, iron-ore, &c. by steam, air, and fire, and for impregnating the same with inflammable air, by which he produced a tough metal.

The patentee directs any portion of iron-stone, or ore, together with a quantity of fossil-coal, to be put into a furnace, into which fire is to be admitted, and steam conveyed from a boiler, by means of pipes, through an aperture made in the hearth. These pipes are not to project into the furnace, but only to extend so far as to permit the steam to convey along with it a quantity of atmospheric air; and thus a calx sufficiently pure will be produced. The process of purification may be facilitated, by placing a vessel of water at the bottom of the furnace, or building, for the reception of the hot calx while it falls, or is disengaged. And if sometimes a proper proportion of sal-ammoniac, or other menstruum, be thrown in among the coals, &c. while purifying, that operation will be, in a considerable degree, facilitated.

When the calces are thus prepared, a portion of them, and also a quantity of fossil-coal, or purified coals, are to be put into a smelting furnace, beneath which a fire is to be kindled. Apertures are also to be made for the introduction of inflammable air, from one or more retorts, by means of pipes, either singly or conjointly with *air-blast*. Limestone, charcoal, and other substances abounding with inflammable air, may be added in due proportions, and will have an effect similar to that produced by the inflammable air alone, for which it may be occasionally substituted. The patentee observes, that the proportionate quantities of the various materials employed, can only be ascertained by experience; and the result of this process will be the production of a tough metal, capable of being applied to several useful purposes.

FOSSIL-PITCH, or HARDENED ROCK-OIL, *Petroleum induratum*; a bituminous production (see BITUMENS), which consists of two varieties.

1. The *Asphaltum*, or pure fossil-pitch, which is found in the shores of the Dead and Red Seas; and in various parts of Europe. It is a hard, smooth, brittle substance, destitute of smell, and externally of a black or brown colour, but when exposed to the rays of light, appears of a deep red.—It is chiefly used by watch-dial makers, who mix it with lamp-black, and oil of turpentine. The preparation of this compound is said to be kept secret by certain persons at Strasburgh, in Alsatia.

2. The *Pix montana impura*, or *Pisasphaltum*, which is found in Sweden, Italy, and other parts of Europe. It coheres like slag, or the dregs of iron, and is of the colour of black-lead; but, if subjected to strong heat, it is soon volatilized; and, if left in the retort, a liquid substance distils into the receiver, resembling rock oil.—This mineral oil is never used in England as a medicine; but in France the common people give it in drops for hysteric complaints, and also to their children, with a view to expel worms.

FOUL, a disorder in cattle, which proceeds from a peculiar state of the blood, and a watery rheum that descends into the legs, and occasions swellings. To remove this malady, it has been advised to throw the diseased quadruped on its back, and to tie its legs together, when the skin is to be slit with a sharp knife, in a straight direction above the heel. After this operation, a plaster consisting of nettles, garlick, and salt, should be applied to the wound, for a day or two: thus, it is said, the animal will be effectually recovered.

The appellation *foul*, is also given to a swelling between the clefts, or claws of cloven-footed cattle: it is produced by a worm, and gradually increases till it breaks, at the same time causing the affected creature to halt. To expedite the cure of this complaint, the tumor is directed to be lanced, before it is thoroughly ripe, and as soon as the matter is discharged, the wound should be anointed with a mixture of tar and grease. By these applications, together with keeping the feet clean, the disorder may be easily removed.—We confess, however, we have had no experience in either cases of this veterinary practice.

FOUNDERED, a disease in the feet, to which horses are subject. It is occasioned by hard riding, severe labour, great heats, sudden colds, &c. that inflame the blood, and, as the farriers express it, *melt the grease*, which descends into the feet; where it settles and causes such a numbness and pricking in the hoof, as in some instances to render the animal affected unable to stand.

The general methods of removing this disorder are, first, bleeding, which operation, if opportunely performed, is calculated to afford immediate relief.—The rapid and irregular circulation of the blood is then to be diminished, by giving the horse cooling salts internally, clysters, an opening diet, and plenty of diluting liquor four or five times every day, together with emollient poultices; which ought to be applied warm round the hoofs, in order to soften them, and to promote a free and equal perspiration.

But the sole or frog of the foot affected, should on no pretence be pared to that excess, which is too frequently done by ignorant farriers. It will be sufficient to clear away the hardened surface of the sole, that the poultice may properly open the pores. All greasy and oily applications should likewise be avoided, being ill calculated to accelerate the cure.

FOWL: See POULTRY.

FOWL-GRASS: See Roughish MEADOW-GRASS.

FOX, or *Canis vulpes*, L. an animal of the canine race, well known for his cunning, and the depredations he commits in farm-yards among poultry, and in warrens among rabbits.

Foxes produce but once a year, and the litter generally consists of four or five, but seldom six or eight; and never less than three. The time of gestation is in the winter, and young cubs are found in the month of April. These, like dogs, are brought forth blind; they continue to grow fifteen months or longer, and live to the age of fourteen years.

It is remarkable, that on its long hairy tail the fox has a small bunch of hair which emits an agreeable odour, not unlike that of violets: this proceeds from a gland secreting a viscous humour, which is supposed to serve him as a balsam in healing wounds, or as a cordial. His woolly tail is dexterously employed for catching lobsters from the hollows of brooks and rivulets, as well as for blinding his persecutors, the dogs, &c. when it is moistened with urine. But the greatest proof that bespeaks his wonderful ingenuity, is displayed by the manner he rids himself in summer of fleas, his most troublesome enemies. He first seizes with his mouth a parcel of moss, then gradually, but with retrograde steps, immerses himself in water to the point of his mouth; and, when these vermin have retreated to the moss, he suddenly drops his cargo.

The fox is not easily, and never completely tamed: when deprived of liberty, he languishes; and if kept too long in a domestic state, he dies of chagrin. His skin is furnished either with a white, grey, blueish, or black fur, which, on account of its softness and warmth, is in many parts of Europe employed for making muffs, and lining clothes. The fur of the black fox caught in the North, is sometimes sold at the excessive price of 200 guineas.

Various methods are practised for exterminating these predatory animals: they are hunted with dogs; iron traps are frequently set at their holes, which are also occasionally smoked to expel them, so that they may the more readily fall into the snares laid for their destruction. The most common mode of taking foxes, is by means of gins: these being baited, and a train made by drawing raw flesh across his usual paths, or haunts, to the trap, he is frequently decoyed. —We conceive, however, that the most easy method of reducing him to captivity, would be an imitation of that practised in the immense woods of Poland, for catching wolves alive. It simply consists in digging *circular* holes of sufficient depth, depositing fetid carcasses in them as an allurement, and covering them with boards and moss, provided with a *trap-door* level with the ground. In this manner, all the foxes in the United Kingdom might be exterminated in one season, and much injury prevented, which is every year suffered by the husbandman, chiefly for the sake of perpetuating a gratuitous chace.

FOX-GLOVE, the COMMON, or PURPLE, *Digitalis purpurea*, L. an indigenous biennial plant, growing in meadows, on hedge-banks, and the sides of hills; in dry, gravelly, or sandy soils, but seldom on flat grounds, unless in very dry situations: for, though the seeds vegetate, the roots decay in the winter, and the plant consequently perishes. It abounds in the Midland, but is rarely seen in the Eastern counties, and produces purple flowers, which blow in the months of June and July.

The leaves of the fox-glove have a bitter nauseous taste, but do not possess any peculiar smell: they have long been used with considerable advantage, in the preparation of an ointment for sores and scrophulous tumors. If taken internally, this plant is a violent purgative and emetic:—in the country, a decoction of it, with the polypody of the oak, is frequently given in epileptic fits.

An infusion of two drams of the leaf, in a pint of water, given in doses of half an ounce, till it begin to operate, is recommended for the dropsy, especially that of the breast; in which disorder it has proved of the greatest utility: the plentiful use of diluents is ordered during its operation. It has likewise been taken in substance, at bed-time, in doses of one, two, or three grains of the leaves pulverized; and often operates as a very powerful diuretic, without producing any other evacuation. Sometimes, however, this dose excites severe and unexpected vomiting; it has also the remarkable property of rendering the pulse slower; frequently occasions distressing giddiness, and affects the power of vision.

The *Digitalis* has, within a few years, been advantageously employed in *pulmonary consumptions*, and other disorders, where the frequency of the pulse requires to be abated, with a view to repress the irregular action of the arterial system, and arrest the progress of disease; and though we doubt whether any thing like medicine, or factitious air, will ever be discovered for the cure of that merciless disorder, yet we entertain a very high opinion of the powers of the fox-glove, if timely administered; but we think it our duty to add, that it is one of those active and virulent plants which cannot safely be entrusted to inexperienced persons, or empirics.

As every part of fox-glove has a very bitter and acrid taste, by which it is apt to corrode the mouth, throat, and stomach, children ought to be warned against its poisonous properties.—Sweet butter-milk, or oil and vinegar, in large draughts, will be the most effectual antidotes.

FOX-TAIL GRASS, or *Alopecurus*, L. a genus of plants consisting of 18 species, of which Dr. SMITH enumerates four, and Dr. WITHERING six, to be natives of England: the principal of these are the following:

1. The *pratensis*, or Meadow Fox-tail-grass, which is perennial, grows in meadows and pastures, and flowers in the month of May or June. This plant thrives naturally in moist soils only; it affords the best grass that can be sown on low meadows, or in boggy places which have been newly drained. Its seeds ripen early, and are easily collected. Although sheep pasturing on it, are said to acquire a coarser fleece, yet it furnishes a most grateful food to cattle; but, as the larvae of a species of flies devour the seeds to so great an extent, that in many spikes scarcely one will be found perfect, its cultivation is rather precarious. These insects are very minute, of an orange colour, and are the prey of the *Cimex campestris*, or Field-bug, whose mouth is peculiarly formed for searching the husks of grasses.

2. The *bulbosus*, or Bulbous Fox-tail-grass, which is perennial, grows in moist marshy situations, and flowers in the months of June and July. This species is particularly adapted for consolidating the surface of fenny situations. Hence it deserves to be more generally cultivated in such soils, in order to prevent them from being poached by the feet of cattle.

3. The *agrestis*, or Slender Fox-tail-grass, which is likewise perennial, grows in corn-fields or on road sides, and flowers in the month of July. This plant is provincially called *black-bent*; and, though a very troublesome weed, when growing among wheat, it might be sown with advantage as a meadow-grass; for, in its green state, it is much relished by cattle; and BECHSTEIN asserts, that cows fed with it, give an unusual quantity of milk.

FRACTURES of *Bones*, are accidents which generally arise from external injury. They are either *simple*, when the skin and other integuments remain sound; or *double*, when splinters are projecting, and the fracture communicates with a wound.

If, after a severe fall, or blow, the patient feels pain, accompanied with swelling, and tension of the contiguous muscles; when a grating noise, distortion, and a loss of muscular power are perceived on handling the injured part, there is every reason to apprehend that the bones are broken. No time should then be lost in applying to a skilful surgeon; as fractures and contusions, especially those of the ribs, are generally attended with febrile symptoms, which require the immediate use of the lancet. Meanwhile, the limb should be placed in the easiest posture, and the body kept quiet, cool, and open, by emollient clysters.

As soon as the size and situation of the fractured bone is ascertained, two or more splints made of leather or pasteboard, exactly fitting the injured limb, should be procured, and moistened previous to their application: thus, they will soon accommodate themselves to the shape of the parts, and serve to retain the limb steady with a very slight bandage; for which purpose, that of 12 or 18 tails is preferable, as being more easily applied and removed than the usual rollers.—Fractures of the ribs require adhesive plasters; the patient must always lie straight and easy, without being exposed to opportunities of sneezing, laughing, coughing, or distending his stomach by hard food. Hence the lightest provisions, and frequent weak or diluent drink, are necessary.—The most proper external application in fractures, is a mixture of equal parts of vinegar and water, with which the compresses and bandages should be repeatedly moistened.

The greatest care should be taken to retain the bones, after they are replaced, in their situation, by proper compresses, or bandages, which, however, should not be too tightly applied. Much depends on the age and habit of the patient, with respect to the time necessary for performing a cure; though, in middle-aged persons, and under favourable circumstances, a fracture of the leg or thigh bone may be healed in two months; of the arm, in six weeks; of the ribs, clavicles, and bones of the hand, in three weeks. But in old age, a much longer time is generally required than during infancy.

FRAGRANCE: See ODOUR.

FRECKLES, are spots of a yellowish colour, about the size of a lentile-seed, frequently appearing on the face, neck, and hands.—These discolourations are either constitutional in the individual, or arise in consequence of the jaundice, or the action of the sun upon the part. Heat, or a sudden change of the weather, often causes the skin to assume a darker colour than natural, and thus produces what is called *tan*, *sun-burn*, and *morphew*, which differ only in degree, and usually disappear in winter.

Persons of a delicate complexion, and particularly such as have naturally red hair, are most subject to freckles in the face, and other parts exposed to the air. For the gratification of those who consider the removal of such little blemishes an object worthy of their attention, we shall communicate the following remedies:

According to HOMBERG, one of the best applications for dispersing freckles, is a mixture of bullock's gall with a solution of alum, which, after the latter has subsided, must be digested in the sun for three or four months in a close phial.—Another preparation is made by taking 4 oz. of lemon-juice, and mixing with it 2 drams of sugar, and one of borax, finely powdered; and, after these ingredients have stood a week or fortnight in a glass bottle, the liquor will be fit for use.—As, however, freckles generally vanish during the winter, and have been observed to re-appear in early spring, the sharp *morning-air* of which, though salubrious, is said to be uncommonly favourable to their re-production, perhaps the most easy method of preventing them, would be a careful attention to this circumstance.

FRENCH-MERCURY, or *Mercurialis annua*, L. an indigenous plant, growing on waste places, and dunghills in the vicinity of towns; and flowering in the months of August and September. The whole of this vegetable is mucilaginous: when cultivated in gardens, it is dressed like spinach, to which it is said to be greatly superior; but, if eaten in a large quantity, it is aperient.—In France, according to TOURNEFORT, a syrup is prepared from the juice of the mercury, 2 oz. of which are given at one dose as a laxative: it is also used in clysters, and pessaries, in the proportion of one part of honey and two of the juice.—In England, this plant was formerly in great repute as an emollient, but is at present disregarded.—As an article of diet, it may be useful to persons liable to costiveness.

FRENCH-WHEAT: See BUCK-WHEAT.

FRICTION, in medicine, is the act of rubbing a diseased part with oils, unguents, and other matters, in order to ease, relieve, and cure it.

Friction is also performed with a flesh-brush, a linen-cloth, or with flannel; which last is the most eligible. It is a kind of exercise that remarkably contributes to the health of sedentary persons; for it excites and kindles the natural warmth; diverts defluxions; promotes perspiration; opens the pores; and tends to dissipate stagnant humours.

This operation is particularly beneficial to the nervous, debilitated, and studious; being an useful substitute for other exercise. Hence we recommend to such individuals to spend half an hour every morning and evening in rubbing their whole body, especially their limbs, with a clean piece of flannel. It ought, however, to be observed, that this practice will be of the greatest service when the stomach and bowels are empty.

Lastly, we venture to affirm, that the most important purposes to which *friction* may be rendered subservient in the animal economy, have hitherto been almost entirely neglected: we are, however, convinced from experience, that *medicated* frictions, or the introduction of the most active medicines into the human system, by rubbing them in properly on the surface, might be attended with the most happy effects, especially in all chronical diseases. Common sense appears to have long since pointed out this excellent method of administering medicines, even to the Indian savages, though it is little practised in enlightened Europe, where the *stomach* is doomed to be the field of battle, for deciding commotions and irregularities in our complicated frame. But who is hardy enough to maintain, that the digestive organ was by Nature destined to be the *exclusive* vehicle of drugs, and to serve as their common laboratory?

FROG, or *Rana*, L. a genus of amphibious reptiles, consisting of 17 species, the most remarkable of which are;

1. The *temporaria*, or Common Frog, which is an animal so well known as to render any description unnecessary.—Some of its properties, however, are very singular: its power of leaping is extraordinary,

nary, and it swims better than any other quadruped. Its body is naked, and without any tail: the fore limbs are very lightly made, while the hind legs and thighs are remarkably long, and furnished with strong muscles. As soon as the spawn is vivified, the future frog becomes a tadpole, in which state it is wholly a water-animal; but as soon as it is changed into a frog, and attains its proper shape, it immediately migrates to the shore.

These animals adhere closely to the backs of their own species, as well as to those of fishes. It has been remarked that they will even destroy pike; and it is certain that they materially injure carp, by fixing their hind-legs to the back of those fish, while their fore-legs are fastened to the corner of each eye; so that the carp become much exhausted, and frequently sink under the weight of so disagreeable a companion.—See Fumitory.

2. The *esculenta*, or Eatable Frog, differs from the former species, only in having an high protuberance in the middle of the back, which forms an acute angle. Its colours likewise are more vivid, and its marks more distinct, the ground colour being a pale or yellowish green, marked with rows of black spots from the head to the rump.—Both this and the preceding species are, according to Mr. Pennant, used as food, though rarely in this country.

FROST, is that state of the atmosphere, which causes water and other liquids to congeal, or freeze.

Frost is supposed to descend from the upper parts of bodies; but no experiments have hitherto ascertained to what depth it will extend either in earth or water, as its effects vary, according to the degree of coldness in the air, the longer or shorter duration of the frost, the texture of the earth, the nature of the juices with which it is impregnated, &c.

In cold countries, the frost frequently proves fatal to mankind, not only producing mortification, but even death itself. The hands of those unfortunate persons, who die in consequence of intense cold, are first seized, till they lose the sense of feeling; next a drowsiness pervades the whole body, which, if indulged in, is attended with imperceptible dissolution.

If animation is suspended from severe frost, the following will be the external symptoms: rigidity of the whole body; and inflexibility of the limbs, which continue in the same posture as the frozen person had adopted during the unfortunate accident; the teeth are closed; froth sometimes issues from the mouth; there is a total insensibility to all stimulants, and the extremities are partly mortified, and, in some instances, spontaneously separate.

Notwithstanding these unfavourable appearances, every exertion ought to be instantly made to restore life, if possible, by strictly adhering to the following directions; because there is a greater probability of recovering such persons, than those deprived of life, in consequence of drowning or suspension by the cord.

No external warmth of any kind must be applied to frozen persons, till the internal or vital heat, be excited; when the former also should be carefully and very gradually adapted to the manifest degree of the latter. Hence the whole process should be performed either in the open air, or in a cold room; the body cautiously carried in a posture somewhat erect, to the nearest dwelling; the head turned gently towards the right side; and the clothes carefully taken off, without injuring the skin, or bending the limbs. These precautions are necessary, as a rough treatment may easily occasion dislocations of the joints, or fractures of the bones. Next, the whole naked frame, excepting the face, should be covered with a bed of snow from 12 to 18 inches in thickness; or, if this cannot be procured, cold water and ice may be substituted, and cloths successively dipped in it may be spread over the whole body, especially the head and breast. After continuing these affusions, gentle frictions with flannel or soft brushes, likewise immersed into cold fluids, should be commenced; alternately making use of the shower-bath, and persevering in these attempts for an hour at least, when the body ought to be left undisturbed for some minutes. If no signs of life appear, clysters of cold water with oil and vinegar, or six ounces of brandy, are to be given, and the former process again and again repeated; so that five or six hours sometimes elapse, before any symptoms of animation are perceptible. As soon, however, as there is the least prospect of recovery, *warm* fomentations must be resorted to; the degree of friction cautiously increased; or the patient placed in bed between two robust persons; emollient clysters prepared; and, when he is able to swallow, a cup of tea with a little vinegar, wine, or brandy, may be allowed. In many desperate instances, however, it will perhaps be proper to perform venesection, to introduce air into the lungs by means of common bellows, or those described in p. 190 of this volume; or to have recourse to the electrifying machine, or the earth bath, &c. but such cases must be submitted to the judgment of the profession.

The power of cold on vegetables is well known; and, though the frosts of severe winters are on the whole more injurious to vegetation than those of the spring, yet, as the former very seldom occur in this climate, the latter are productive of more extensive damage, because their effects are evident almost every year.—Frosts act most powerfully on ground newly cultivated, on account of the vapours continually ascending from such soil. Trees recently cut, also, suffer more than others from the spring frosts; a circumstance which must be attributed to their shooting forth with greater luxuriance. Hence, likewise, light and sandy soils are thus more frequently damaged than firm and tough land, though both may be equally dry.

As the blossoms of fruit-trees are more particularly affected by early frosts, we shall communicate the following easy and simple methods of securing them:

1. A rope is to be interwoven among the branches of the tree, and one end of it immersed in a pail of water. This rope, it is said, will act as a conductor, and convey the effects of the frost from the tree to the water.

2. According to M. Mallet, the early hoar-frost may be rendered harmless in its effects, by pouring fresh spring-water on the trees and vines thus covered, before the sun rises.—When mist or dew attends a frosty night, but has

not preceded it, Dr. DARWIN supposes that a hoar-frost may be less injurious than a black-frost; because the case of ice on the buds of trees, or on young grass, being instantly produced, covers them with a bad conductor of heat, and prevents them from being exposed to so great cold as is occasioned by the continuance of a black frost, without hoar or rime.

3. An anonymous foreign writer suggests the practice of depriving, towards the latter end of autumn, those fruit-trees of their leaves, which are exposed to the injury of winter-frosts; and adds, that some precaution is necessary in this operation, to save the buds which are by Nature destined to unfold in the succeeding spring, from any external injury. Yet such defoliation ought not to be undertaken with all trees, at the same period of time; as those which possess a greater abundance of sap, should be allowed to keep their leaves to a later season, than others having a less portion of vegetable juices.

In order to recover and preserve such trees from total decay, as have evidently been injured by severe winter-frost, a correspondent has favoured us with the following easy and expeditious remedy; for the success of which he appeals to his repeated experience: When a tree appears to have suffered from intense cold, he advises to make longitudinal incisions in the bark, extending to the whole length of the trunk, on the north, west, and east sides; but never in a southern direction. As the *east-winds* are dry and piercing, very few and superficial slits only should be made on that side. This operation ought to be performed in the month of March, before the first sap rises; and repeated in June, while the second sap ascends; but always so managed, that only the uppermost bark, or *epidermis*, be divided; as too deep an incision, though harmless in the spring, might be attended with fatal consequences in the heat of summer. In trees, however, which are thoroughly frozen, it will be useful to make deeper cuts; thus to give vent to the stagnant fluids, and promote their circulation. These cuts should be directed against the centre of the tree, drawn in a straight line downwards; for, in the contrary case, the bark is apt to separate in chinks, afford shelter to vermin, and eventually frustrate the attempt. By a strict adherence to these rules, it will be found that apple-trees, in particular, when slit in every direction (except the south side, retain all their bark; others, which had undergone one-half of the operation, were but partially preserved; and such as had received only two cuts, retained only the intermediate portion of the bark, from which they produced new shoots. This simple method is farther attended with the additional benefit that, while contributing to the growth of the tree thus affected, it tends to prevent the decay of those which have in the preceding year been injured by the depredations of caterpillars, and the subsequent stagnation of their fluids.

Although it has been generally believed, that frost meliorates the soil, and especially clay-lands, yet as ice contains no nitrous particles, such improvements can only be of a transitory nature, by enlarging the bulk of some moist soils, and leaving them more porous for some time after the thaw; but, when the water has exhaled, the ground becomes as hard as before, being compressed by the incumbent weight of the air.—See also CLAY, p. 3.

Nor is the salutary influence of frosty seasons, on the health of mankind, in the least confirmed by the annual bills of mortality; as many old and debilitated persons, whose vital heat is insufficient to excite into action their vessels, already too unsusceptible of irritation, die in consequence of long frosts, during severe winters. Birds, and other wild animals, as well as tender vegetables, perish benumbed from the same cause.—It deserves, however, to be remarked, that a sharp dry frost does not affect the human skin with that sensation of chilly and piercing cold which we experience, when the air is loaded with moisture, the temperature of which is near the freezing point. This remarkable difference arises from the intense degree of cold produced by the evaporation of fluids (see p. 236), which continually takes place on the surface of living bodies, where it naturally produces a more perceptible effect, than the simple contact of *dry* air would occasion, when it is but a few degrees below freezing. To the young and robust, therefore, frost is more pleasing than moist air; as, in the former, they are able to keep themselves warm by increased exercise; which, in the latter, only tends to promote and render the evaporation more severely felt on the skin. For the same reason, Dr. DARWIN observes, severe and continued frosts "destroy the children of the poor, who want both food, fire, and clothing in this harsh climate."

To preserve vegetable roots, as well as fruit, from the effect of cold, the following directions will be sufficient: Dry sand, and cut straw, are eminently adapted to that purpose. Potatoes, turnips, onions, &c. should be loosely placed on sand, either under or above ground, and slightly covered with cut straw or chaff; but carrots and parsnips, we are informed, may be kept during the whole winter, by placing them in rows or heaps, so that their tops project at the sides, being the reverse of the method followed with turnips when packed in carts.—See also APPLES, vol. i. p. 89.

If, notwithstanding these precautions, vegetables should be injured by the frost, it will be advisable, especially with *frozen potatoes*, to immerse them in cold water for a short time, on the approach of a thaw. By this expedient, the frosty particles are gradually extracted, and the vegetating principle is preserved, after the severest season.

On the other hand, an intense degree of cold is also attended with some good effects. Thus, *aromatic spirits* possess a weaker flavour when newly distilled, than after they have been kept six or seven months, especially during the winter season. Experience has evinced, that this favourable change was produced only by the influence of *cold*; and M. BAUME found, that by immersing quart-bottles filled with liquors, into a mixture of pounded ice and sea-salt, for six or eight hours, the spirit proves as grateful to the palate as that which had been kept for several years.—GEOFFROY remarks, that simple waters also acquire a more agreeable flavour, after having been for some time exposed to the effects of cold.—See likewise VINEGAR.

FRUIT-TREES, are such as bear fruit, namely, APPLE, CHERRY, PEAR-TREES, &c. for the particular culture of which we refer to those articles. At present, we shall confine ourselves to remarks equally applicable to orchards, and to single trees.

While young, no trees should be suffered to bear a large quantity of fruit: and, if they abound with blossoms, the fruit should be gathered as soon as it is formed; leaving only half a dozen of the produce, to ascertain its size and quality. By this measure, the trees will not only produce larger and finer fruit, but, by being kept clear, the leading and collateral branches will every year become more vigorous. Nor ought any young plant, or newly-engrafted tree, to be permitted to *run mop-headed*, as it will make no progress, till each branch has acquired a determined leader: for, if the growth of a tree be prevented, it will be extremely difficult to throw such energy into the system, as to enable it to grow freely.

As long as fruit-trees continue in the nursery, it will be requisite to cut down the head, in order to give strength and symmetry to the stem: it will also be useful to shorten most of the grafts, lest they should be blown out by the wind: these operations likewise contribute to swell the buds.

The ingenious Mr. BUCKNALL particularly recommends, not to place the rows of trees in a situation either directly north or south, but rather inclining to the east, as the sun will then shine upon them in the early part of the day during the spring, and thus dissipate the vapours collected in the night; which, if suffered to condense, will stint the fruit in the earlier stages of its growth. He farther observes, that if the *shaws* (or shades) be properly attended to, the trees being placed in this position, will be enabled to withstand the power of the winds; nor will they be affected by blight. The *shaw* will also protect the fruit from the autumnal winds, by which half the crop of fruit is not unfrequently blown down, before it is ripe: and, as the heads are at that season of the year laden with fruit and leaves, many trées are torn up from the ground, or so lacerated as to be completely spoiled; a misfortune that might be effectually prevented by a proper disposition of the shades.

In the Transactions of the Economical Society of Leipzig, we meet with a communication from the Rev. Mr. GERMERSHAUSEN, on the means of promoting the growth of young fruit-trees, especially in grass land. This method simply consists in spreading *flax-shows*, or the refuse of flax, after it has been *combed*, on the soil contiguous to the trunks of the trees, as far as the roots extend; by which means their size as well as their fertility is remarkably increased. He mentions an instance, where an old plum-tree which, being in a languishing state, in a grass-field, was treated in the manner above directed, and thus not only acquired a new bark, but produced larger, and better-tasted fruit: the young shoots also, which formerly grew up around the stem, were prevented from sprouting forth, because the refuse of the flax excluded the access of air to the trunk, and imparted additional nutriment to the roots. The leaves falling from the trees in autumn, may be substituted for the *flax-shows*, if these cannot be easily procured; but it will be necessary to dig a small trench for the reception of the decayed leaves; and also to cover them with tiles, flat stones, or a log of wood, to prevent their dispersion by the wind. This precaution, however, is not required with the refuse of flax, which adheres so closely to the soil, as to withstand the most violent storm.

Although gardeners bestow the strictest attention on orchards, it sometimes happens that the bark of trees is stripped off by sheep, or by other accidents. In this case, it has been recommended by Mr. W. FAIRMAN, of Miller's House, Lynsted, Kent, to take off the arms of such trees as are damaged; to cut slips of the rind, about two or three inches in width, and to place four or five of them perpendicularly round the naked part. The damaged rind is previously to be cleared away, the sound bark somewhat raised, and the slips inserted beneath it, to promote the circulation of the sap. These dressings are next to be bound very tight with rope-yarn; and a composition of loam and cow-dung, together with a small proportion of drift-sand, should be applied, over which some old sacking, or similar stuff, ought to be fastened. Mr. FAIRMAN adds, that he made an experiment with this mode of treatment, in the spring of 1794, on some trees which had been much damaged by sheep, and that it completely succeeded, the slips adhering closely, and being full of sap.

Fruit-trees, like the rest of the vegetable creation, are the prey of a variety of insects, of which few are more destructive than those infesting apple, pear, cherry, oak, white-thorn, and similar trees.—They deposit their black eggs in clusters, resembling withered leaves, and which are twisted by a cobweb round the uppermost branches. These notorious insects are hatched in the spring, when they assume the form of very diminutive caterpillars, which destroy every thing before them, and rapidly propagate in the most unfavourable weather. They damage oaks very materially; devour the white-thorn, and kill the plant: apples and pears, likewise, receive great injury.—The only remedy hitherto known of exterminating such noxious vermin, is to cut off all the twigs or shoots of every tree on which these nests of insects appear; to collect them in a heap, and burn them as soon as the weather will permit; for, where this necessary operation is deferred till the summer approaches, the insects increase prodigiously, and commit irreparable damage.—See CATERPILLAR and INSECTS.

The disorders to which fruit-trees are subject, are various; the most fatal are BLIGHT, CANKER, MILDEW, MOSS, &c. to which we refer.—See also DISEASES of PLANTS, p. 140, and foll.

The effects of frost are likewise often fatal, especially to the more tender fruit-trees. With a view to obviate such damage, different methods have been suggested; the most practicable of which we have noticed in the preceding article. We shall, however, add a few additional hints, in order that the reader may select such as are the most simple and least expensive.

In a communication from a Swedish agriculturist to a respectable periodical work, published on the Continent, the following expedient is stated to have been successfully employed, to protect fruit-trees from the vernal frosts. As soon as the weather begins to grow cold in autumn, large quantities of water are to be poured on the trunks of such trees, so that they may receive an early impression of the cold. In the spring, snow is to be accumulated round their stems; which retards vegetation, and prevents them from blossoming too early. In consequence of this irrigation, the buds shoot forth at a period, when no apprehension need be entertained from the attacks of the frost that frequently happens during the nights of spring.—Such practice of watering the borders of trees, is said to increase the heat in them, by accelerating the motion of their juices, if the soil of such border has been properly opened and prepared. It is farther recommended, to add one ounce of common salt to every gallon of water, where those borders are old, and have been impoverished by producing many successive crops; or if they have been manured with dung not sufficiently putrified.

There is a method of making *fruit grow, during winter*: and though we are no advocates for premature productions, we have abstracted the following process for the satisfaction of the curious, from the 9th vol. of the *Annual Register* for 1763: Let the trees be taken up by the roots in the spring, at the time they are about to bud; carefully preserving some of their own soil among the roots. These are to be placed upright in a cellar till Michaelmas, when they are to be put into vessels with the addition of fresh earth, and deposited in a stove or hot-house, being regularly moistened every morning with rain-water, in which sal-ammoniac has been dissolved, in the proportion of one ounce to a quart. Thus, in the month of February, the fruit will appear.—The same method is applicable to rose-trees, and flowers; which last, when sown in pots at or before Michaelmas, and watered in a similar manner, will blow towards the end of December.

In order to ascertain when fruits, for instance, apples and pears, are sufficiently ripe to be gathered, it is requisite to attend to the colour of the skin inclosing the seeds. During their infant state, there is no cavity round the kernels, but they are in contact with the seed-vessel. In a subsequent period, when the fruit has exhausted the nutritious matter, the cells containing the seeds become hollow, and the latter assume a dark colour. This, Dr. DARWIN observes, is the proper criterion by which to judge when such fruits should be gathered; as it indicates that they will not continue to increase in size, but waste and become hollow, by absorbing the mucilaginous particles from the centre.

One of the most easy methods of *preserving fruit*, is that of depositing it in *ice-houses*, where it may remain in a frozen state for a considerable time. And, if the fruit be afterwards gradually thawed, by covering it with melted ice, or immersing it in cold spring-water, it will lose but little of its flavour, provided it be consumed on the same day. Fruit may also be preserved, by keeping it in pits dug in a dry soil, or in dry cellars, or even in barns, if the temperature be between 32 and 48° of FAHRENHEIT's thermometer; that is, such as will neither induce frost, nor vegetation. These pits or magazines, however, ought to be covered with such materials as are calculated to repel heat, and to absorb any accidental putrid exhalations, and thus retard the progress of putrefaction. Hence Dr. DARWIN recommends the fruit to be covered first with pulverized charcoal, one or two inches thick, over which is to be laid a stratum of saw-dust, and over the latter, a thick, impenetrable thatch of straw: thus, seeds and fruits may be stored up for ages, without vegetating or decaying. He likewise mentions another mode of preserving fruit, by *heat*. As fermentation will not commence in the heat of boiling water, or 212°; and, as that degree of temperature can be easily procured by steam, or by the vicinity of vessels containing boiling water, he is of opinion, that such fruits as are used for culinary purposes throughout the year, may be kept in a fresh state, by putting them into bottles, and exposing them to the wasted steam of engines; or, by immersing them in the hot water that flows from such steam when condensed; or, by placing the bottles near the boilers which are fixed beside kitchen fires.

Before we conclude this article, we shall briefly observe, 1. That the cutting and pruning of young fruit-trees retard their bearing; though such necessary operations contribute to the richness and flavour of the fruit, as well as to the beauty of the tree. 2. That those plants which produce kernels, yield fruit later, but in greater abundance than *stone-fruit* trees: the time for bearing required by the former being upon an everage five years. 3. That stone-fruit, figs, and grapes, generally yield abundantly at the expiration of three or four years; bear full crops in the fifth and sixth years; and, if judiciously managed, will continue to produce for several seasons. 4. That the fruit of wall-trees, in general, attains to maturity sooner than that growing on standards; and the fruit on the latter, earlier than that produced by dwarfs. 5. That the produce of all wall-trees, which are planted in the south and east quarters, ripens generally about the same period; though that growing in a southern exposure is often earlier than the fruit in the east; while that towards the west is later than either of the former, by eight or ten days; and that exposed to the north, by fifteen or twenty days. Lastly, as the freezing winds of this country proceed from the north-east, we shall, under the head of ORCHARDS, give more particular directions relative to the most proper situation of fruit-trees, and illustrate this interesting branch of husbandry by an appropriate engraving.—See also ENGRAFTING, PLANTATION, PRUNING, &c.

Among the various distinct publications which have appeared on this subject, the following are allowed to possess considerable merit: "*A Treatise on Fruit-trees*," &c. by THOMAS HITT; 8vo. 2d edit. 5s. 3d. Robinson, 1768;—and "*The British Fruit Gardener, and Art of Pruning*," &c. by THOMAS ABERCROMBIE; 8vo. 4s. bound, 1779.

COLOURS FROM FRUITS.—The red juices of currants, mulberries, elder-berries, black-cherries, and other fruit, impart their tinging particles to water, but more completely to rectified spirit; and the tincture acquires a brighter colour. The red watery solutions, as well as the juices, are sometimes rendered dull, and sometimes more lively, by means of acids; they generally acquire a purplish hue, by the addition of alkalies. The greater part of the colours of these juices is perishable, though they strongly resist fermentation, and continue almost unchanged, when the liquor is converted into wine. If the juice be thinly spread upon other bodies, exsiccated, and exposed to the air, the colour speedily decays; the bright red fades sooner than any other; but the dark dull red obtained from the juice of the black-cherry, is of considerable durability.—The ripe berries of the buck-thorn tinge paper of a green colour; when green, those berries afford a yellow, and if ripe, a purplish pigment. There are besides a great variety of other fruits, both wild and cultivated, which impart different colours, and which are noticed in their alphabetical series.

As we treat of the general properties, as well as the relative salubrity of fruit, under the individual heads of shrubs and trees, we shall, in this place, only add, that the injudicious practice of promiscuously allowing it, whether ripe or unripe, to children and infants, is very reprehensible. On account of its acidity, they are not able to bear it in excess; and their digestive powers become too frequently impaired at the expence of other secretions; such as insensible perspiration, and the discharges by stool, both of which are thus ununnaturally promoted.—All fruit given to young people, ought to be perfectly *ripe*: mothers and nurses should likewise bestow especial attention on the cleanliness of the peels, or shells, which, as they generally pass through different hands, or may have been stored in improper places, require to be previously wiped or washed.

FRUMENTY, or FURMENTY, as it is popularly called, is a kind of pottage, prepared of wheat, which is first dried whole in an oven, afterwards boiled, and put into moulds or basons. In this country, it is chiefly made during Lent; and, when boiled up with milk, sugar, and a little spice, it forms a wholesome and nutritive dish.

FRUSH, or RUNNING-THRUSH, in farriery, is a discharge of fetid, and sometimes ichorous matter, from the cleft in the middle of an horse's foot. It affects one, two, and sometimes all the animal's legs; but more frequently appears in the fore-feet. It is occasioned by narrow, concave, or hollow shoes; which, pressing against the fleshy part of the frog, cause pain, inflammation, obstruction of the blood, &c.—There are few cases in which the frush admits of a radical cure; because it is subject to frequent returns, producing at length lameness, in consequence of exposing the raw and tender parts to the action of sand, gravel, hard ground, &c.

But, if the disease proceed from contracted, narrow heels, in those feet which are said to be *hoof-bound*, it cannot be cured, without removing the first cause; though even in that case it will only admit of palliation. In wide hoofs, however, that are open at the heels, and where the complaint is recent, or is suspected to arise from concave shoes, or from keeping the hoofs too hot, dry, and hard, the cure may be effected with ease and safety, by laying aside those shoes; washing the frogs clean after exercise, and dressing them with *Mel Ægyptiacum,* prepared in the following manner: Take 2 oz. of verdigrease finely pulverized; 6 oz. of honey, and 4 oz. of vinegar: let the whole be boiled over a gentle fire, till it acquires a reddish colour. Or, 2 oz. of blue vitriol, dissolved in a quart of water, may be substituted for the preceding composition, if the hoofs be kept cool and moist. At the same time, it will be requisite to have recourse to bleeding, and purging-medicines, which may be repeated two or three times at proper intervals; or, to diuretics, which are preferable, as they may be continued for some time, without confining the horse to the stable.

FUEL is the aliment or food of fire.

The fuel generally used in Britain is pit-coal: it is attended with considerable expence, that is not a little increased by the enormous waste, arising from the injudicious manner in which the fires are usually managed. Hence different compositions have been proposed, among which that contrived by Count RUMFORD more particularly claims our attention. It is known by the name of *kindling-balls,* which are composed of equal parts of *coal, charcoal,* and *clay*; the two former are reduced to a fine powder, well mixed and kneaded together with the clay moistened with water; and then formed into balls of the size of hens eggs, which are thoroughly dried. These balls may be made so inflammable as instantly to take fire from the smallest spark, after they have been dipped in a strong solution of nitre, and then dried. With those three ingredients, Count RUMFORD is of opinion, that a certain proportion of straw, cut very small, or of chaff, or even of saw-dust, may be advantageously incorporated.—The excellence of the fuel thus prepared, consists in its economy and cleanliness; circumstances of the utmost importance, and which are calculated greatly to improve the apartments of the opulent: for, he observes, " nothing is more dirty, inelegant, and disgusting, than a common coal fire."—The Count's invention is somewhat similar to the patent COAL-BALLS prepared by Mr. FREDERICK, of which we have already given an account in p. 19.

To this may be added, the *improved fuel* invented by Mr. PETER DAVEY, to whom a patent was granted early in the year 1801. The substances he employs are, a mixed coke composed of pit-coal and charcoal, in various proportions, united previously to the operation of *coking.* The patentee takes small sea-coal, to which he adds charcoal, saw-dust, tan, or any other materials that may be converted into charcoal, in proportionate quantities: these, however, are not specified, and he simply observes, that for furnaces, or other large fires, the quantity of sea-coal is to be increased; and, when the fuel is intended to be burned in small fires, it is to be diminished. After mixing the different ingredients, they are to be dried in kilns, and heated so as to make them intimately cohere, and expel the moisture and oily parts, without consuming the substance of the coal: in this state the fuel is fit for use.

We do not pretend to decide, which of the preparations abovementioned is preferable; as they are all eminently calculated to introduce economy in one of the most useful articles of domestic convenience—*fire.*

Beside these compositions, various machines have been invented for saving fuel, of which the following are worthy of notice:—In May, 1792, Mr. David Frearson, of Liverpool, obtained a patent for machinery and operations for the purpose of saving fuel, in the process of evaporating water from solutions of salts, or the waste or leys of soap-makers; and which may be applicable on other occasions, where the evaporation of water from substances holding it in solution is required. For the particulars of this invention we refer the reader to the 9th vol. of the "*Repertory of Arts and Manufactures,*" where he will find the whole process amply detailed.

A patent was likewise granted, in June, 1798, to Mr. George Blundell, of Bethnall - green, Middlesex, for his invention of a machine calculated for the purpose of saving fuel, and preventing dirt or dust from fires, which he calls an "*Economical Receiver.*"—The apparatus consists of certain receivers, or boxes, formed of metal, either simple, or compound, and which are either square, oval, or of any other shape that may be required, in order to be fitted beneath any kind of grates, stoves, or fire-places. Over this receiver is fixed a grating, or net-work of wire, which intercepts the cinders, and suffers the ashes to fall into the lower part of the vessel. There are likewise sliders, and other pieces of machinery; an explanation of which is inserted in the 10th vol. of the work above cited.

FULLERS'-EARTH, or *Argilla Lithomarga*, is a species of clay, of an ash-coloured brown, and presents various shades, from a very pale to nearly a black colour: it is in general of a greenish cast.

This earth is hard, firm, and of a compact texture, but soft to the touch, and neither stains the hands nor easily breaks between the fingers. Its surface is somewhat rough and harsh; it dissolves easily in the mouth; and, in a slight degree, adheres to the tongue. When thrown into water, it does not cause any effervescence, but gradually increases in size, and subsides in a fine soft powder.

The largest stock of the finest fullers'-earth in the world is obtained from the pits at Wavedon, near Woburn, Bedfordshire; where strata of it are found at the depth of ten or twelve feet from the surface of the ground. This earth is also found in abundance, and of a good quality, in certain pits near Brick-hill, in the county of Stafford; near Ryegate, Surrey; Maidstone, Kent; and in the vicinity of Nutley and Petworth, in the county of Sussex.

Incalculable quantities of fullers'-earth are consumed in this country, in the scouring of cloths, stuffs, &c.; for which it is of the greatest utility, as it imbibes all the grease and oil used in the preparing, dressing, &c. of wool. For this reason, it is declared to be a contraband commodity, and is prohibited to be exported, under the penalty of one shilling for every pound weight.—As an article of domestic economy, it might be more frequently employed than it is at present, especially in the cleaning and scouring of wooden floors and wainscots, being an excellent substitute for soap, of which great quantities are now consumed, and unnecessary expences of housekeeping thus incurred.

FULLING, is the art of cleansing, scouring, and pressing cloths, stuffs, and stockings, to render them stronger, closer, and firmer: it is also sometimes called *milling*.

The fulling of cloths, &c. is performed by a kind of water-mill, thence called a *fulling*, or *scouring-mill.*—Without describing the mechanism of this manufacturing process, we cannot omit to remark that urine is sometimes employed, as well as soap and fullers'-earth, to prepare the stuffs for receiving the first impressions of the pestle. They are first steeped in urine, then in a solution of fullers'-earth and water, and lastly in soap, dissolved in hot water. Soap alone would fully answer this purpose, but it is too expensive, especially as, according to the present mode of dressing, fullers'-earth is of equal efficacy. Urine is certainly prejudicial, and ought entirely to be abandoned here, both on account of its disagreeable smell, and its sharp, saline properties, which frequently render the cloths dry and harsh. The *scouring* of cloth, however, is not the only object in *fulling* it; the alternate pressure communicated by the pestles, or stampers, to the stuffs, occasions in its advanced stages an effect analogous to that produced upon hats in the operation of *felting*, mentioned p. 256.—Thus, the fibres of wool which compose one of the threads, whether of the warp or the woof, assume a progressive motion, first introducing themselves among those of the contiguous threads, then into those which follow, so that gradually all the threads, both of the warp and the woof, become completely felted. The cloth, after having by this process become contracted and shortened in its dimensions, partakes in a great measure of the nature of *felt*: hence it may be cut without being liable to unravel; and consequently there is no necessity to hem its edges.—Farther, as the threads of both the warp and woof are more intimately combined, the web, which acquires a greater degree of thickness, likewise forms a warmer clothing.

The process of *fulling stockings*, *caps*, &c, is performed in a manner somewhat different from that in the mills; namely, either with the feet or hands; or a kind of rack or wooden machine, armed with teeth of the same materials; or, which is still better, horses' or bullocks' teeth may be substituted. In this operation, urine, green soap, white soap, and fullers'-earth are employed; but the first of these ingredients, for the reasons before stated, is here also detrimental to the texture. Stockings manufactured in a loom, should be fulled with soap alone; but, for dressing such as have been knit, earth may likewise be added.—Lastly, knit-worsted is by this process rendered less subject to *run*, if a stitch should happen to drop in the stockings.

FUMIGATION, in medicine, denotes the artificial impregnation of the atmosphere, with the fumes or smoke of any vegetable or aromatic substance.

Considerable injury is often produced by inhaling the subtle corrosive fumes of metallic and other processes; so that palsy in lead-mines, and pulmonary complaints in manufacturing towns, are but too frequent: hence we doubt whether *medicated fumes* deserve that encomium which has lately been bestowed on them, by various writers. In our opinion, there is no better and more effectual fumigator in Nature than *pure air*, frequently renewed by means of *ventilators*.

As, however, there are numerous advocates for *factitious* airs and fumigations, we have no hesitation to admit that they may sometimes be resorted to with advantage, for the purpose of purifying rooms that have been occupied by patients whose disorders were contagious. Hence the fumes of tobacco, and the effluvia of tar, have been especially praised. The late Dr. Lind advised cascarilla-bark to be burned, or the camphorated steam of vinegar to be diffused, as being eminently calculated to dispel infection.

With respect to the fumigation of stables, or other buildings, where cattle are infected with the *distemper*, it has been recommended to put an ounce of common salt in a varnished pipkin, upon which are to be poured two ounces of spirit of vitriol, diluted with one ounce of water. The vessel is then to be placed for an hour on a chafing-dish provided with live-coals, in order that its contents may be heated to a slight degree of ebullition. The whole being safely deposited in the middle of a stable, the vapours are permitted to rise, till the air of the building is saturated. Thus, the malignant miasmata in the air, are supposed to be neutralized, or corrected; but the process ought to be repeated twice in twenty-four hours, at equal periods, during the prevalence of the contagion.—No good, however, will result from this or any other fumigation, without the frequent admission, and change, of fresh air.

FUMITORY, or *Fumaria*, L. a genus of plants comprising nineteen species, five or six of which are natives; and among these the principal are:

1. The *officinalis*, or Common Fumitory. It is annual, grows in corn-fields, hedge-banks and gardens, and is in flower from May to August.—This plant is eaten by cows and sheep; goats dislike it, except the young shoots, but horses totally refuse it.—The leaves are succulent, saline, and bitter. The expressed juice, in doses of two or three ounces, is strongly recommended in hypochondriacal, scorbutic, and such habits as abound with vitiated humours. It corrects acidity, and strengthens the stomach. Hoffman, in these cases, preferred it to all other medicines. On account of its efficacy in opening obstructions, and what are professionally called *infarctions* of the viscera, especially those of the liver, an extract of it deserves to be kept in the shops. If the juice be taken in large doses, it proves both diuretic and laxative: it may also be mixed with whey, and used as a common drink.—An infusion of the leaves of this plant is employed as a cosmetic, to remove freckles from the skin.

2. The *solida v. bulbosa*, or Solid Bulbous Fumitory, which grows in woods and parks (for instance, Levan's Park), and flowers in April or May.—Bechstein relates, that this plant affords a certain remedy for the extermination of frogs in fish-ponds.

FUNERAL RITES, are those

ceremonies which are religiously observed at the interment or burial of the dead. They varied among the ancients, according to the different genius and religion of each country.

It is not, however, our design to specify these ceremonies, but merely to point out an abuse that loudly claims the attention of all. In many populous parishes, within the bills of mortality, a dangerous practice prevails, of excavating pits (graves they cannot be called) for the reception of the poor, who, being *packed* in four deal-boards loosely nailed together, are there deposited, till the hole is sufficiently filled. During the interval, planks are laid over the common grave; and, when the uppermost coffin arrives, a minister is employed to mutter, at once, the usual prayers over the hapless victims of poverty, who are then covered with the maternal earth. Such mal-practice demands an immediate remedy; as the mephitic vapours arising through the planks, especially during summer, have the most noxious properties; and perhaps many have met with a premature grave, from inhaling those putrid exhalations.—Facts like these, we conceive it our duty to state, on account of their immediate influence on the health of every inhabitant.

Fungus. See MUSHROOM, and WHITE SWELLING.

FUR, in commerce, signifies the skins of wild quadrupeds, which are dressed with alum, without depriving them of the hair; and which form a part of the robes of princes, magistrates, and others. The skins chiefly used are, those of the sable, ermine, bear, beaver, hare, &c.

Furs did not become an article of luxury in this country for many ages, and were imported principally from Italy, till, since the conquest of Canada and the more northern parts of America, we have obtained them from the Indians.

The furs at present used, are those brought from the remotest parts of North America by the Hudson's Bay Company, and from Russia. They are very valuable, especially the skins of ermines, black foxes, and sables, for which various prices have been paid, from 20 to 100 guineas.—Imported furs are subject to heavy duties, which our limits will not permit us to enumerate.

With respect to its influence on health, we shall briefly remark, that *fur* deserves no commendation as an article of ordinary dress. Its alkaline and oily particles stimulate the skin, when in contact with it; thus partially increase perspiration, and lay the foundation of colds and catarrhs. A fur dress readily attracts infection, and acquires an intolerable smell. Hence whole nations that wear such garments, are exposed to obstinate cutaneous diseases, and, perhaps, to the propagation of the plague itself; which is said to be spread among the Turks, chiefly by their absurd cumbersome dresses lined with animal hair.

FURNACE, an utensil, or apparatus, in which a strong fire, either of coals or of wood, may be raised and maintained.

There is a great diversity of furnaces, according to the different purposes to which they are applied; but, as it would exceed our limits to specify them, we shall only state the chief points to be attended to in their construction, and next mention the various patents that have been granted to speculative individuals.—The chief objects in building, and arranging a furnace, are:

1. To confine the heat as much as possible to the matter which is to be operated upon. Hence the fire is usually limited to a cavity, formed with that intention, and which is provided with a door for supplying it with fuel, as likewise with a grate for supporting it, and permitting the air to pass through, as well as the ashes to drop down into what is called the *ash-pit.*—Thus, the heat is restrained so as to exhaust its force on the subject inclosed.

2. To prevent such heat from being dissipated; which design is effected by simply shutting the door of the furnace, and placing the matter to be acted upon, in such a direction as to receive the whole force of the fire, in its passage up the chimney.

3. To produce an intense heat with the smallest possible quantity of fuel. Hence the throat, or funnel of the chimney, is occasionally contracted by a sliding plate; which, when shut closely, prevents the passage of any smoke or air; and, on drawing it out in a greater or less degree, leaves a vent proportionally large or small. Thus, a large quantity of fuel may be put in the furnace at one time, that will be slowly consumed, and consequently require less attention, than those furnaces which are destitute of this improvement. Where no great degree of heat is required, the sliding plate may be of cast-iron; in some cases, however, fire-clay will be more serviceable; but this contrivance is inapplicable to such furnaces as consume large quantities of fuel, and especially where metals are to be melted.

4. To arrange the whole, so that the degree of heat may be regulated at pleasure; which intention is effected by admitting only a certain portion of air to pass through the fuel. For this purpose, the late Dr. BLACK recommended to fill the upper part of the furnace frequently with small portions of soot, so that by closing the door of the *ash-hole,* and perforating it with a certain number of holes corresponding to each other other, a sufficient controul may be obtained over the fire. When the heat is to be increased, all the passages should be opened, and the height of the vent extended; by which means the column of rarefied air will be enlarged, at the same time its passage through the fuel promoted, and consequently also the heat of the furnace rendered more intense.

In June, 1785, a patent was granted to Mr. JAMES WATT, of Birmingham, for his newly-improved method of constructing furnaces or fire-places for heating, boiling, or evaporating water, or other liquids; and also for heating and melting metals, or smelting ores; by which greater effects are produced from the fuel, and the smoke is in a great measure prevented or consumed. The patentee effects these different objects, by closing every passage to the chimney or flues, excepting those left in the interstices of the fuel; by placing fresh fuel above or nearer to the external air, than that which is already converted into coke or charcoal; and by constructing the fire-places so that the flame must pass downwards, or laterally, or horizontally, through the burning fuel, and also from the lower part or internal side of the fire-place, to the flues or chimney.—In some cases, Mr. WATT causes the flame to pass through a very hot funnel, or flue, previously to its arriving at the bottom of the boiler, or at that part of the furnace, where it is intended to melt metals; by which contrivance the smoke is still more effectually consumed. In other cases, he directs the course of the flame from the fire-place immediately into the space beneath a boiler, or into the bed of a melting or other furnace.—A minute account of this machinery is inserted in the 4th vol. of the "*Repertory of Arts and Manufactures*," where it is described and illustrated by engravings.

In 1794, Mr. HENRY BROWNE, of Derby, invented an ingenious furnace, calculated to facilitate evaporation; for which the Society for the "Encouragement of Arts," &c. rewarded him with a gold medal.—By this arrangement, the heat is first carried under the vessel, then reverted back on the sides, and, at length, conveyed over the surface: thus the air in contact with the liquor is heated and rarefied to such a degree, that the fluid is raised into vapour or steam, much sooner, and with less fuel, than in the cold atmosphere; and, as the air necessary to keep the fuel in combustion passes over the surface of the liquor, every pernicious vapour is carried with it into the fire, where it is decomposed, or at least rendered innoccuous. Mr. BROWNE's furnace is likewise so constructed, that as much fuel may be laid on the fire at one time as will be required for twelve, or even twenty-four hours; and thus one man is enabled to perform the labour of *three*, with much greater facility than by the usual method. Beside this advantage, the evaporation is more speedily effected; less fuel is consumed than in the common boilers now in use; and, neither the operator nor the neighbourhood will be annoyed with the most pernicious vapour.—Those who wish to be informed of the various parts of this useful contrivance, we must refer to the 12th volume of the "*Transactions*" of the Patriotic Society before mentioned, where it is minutely described, and illustrated by an elegant engraving.

A patent was granted in December, 1798, to Mr. WILLIAM RALEY, of Newbald, in the East Riding of Yorkshire, chemist; for his invention of a philosophical furnace and boiler, with an actuating wheel appended to them; and which are applicable to the drawing of foul and inflammable air from pits, mines, &c. to several branches of pharmacy, and various mechanical purposes. As, however, this machinery is scarcely suitable to domestic economy, we shall only add, that the specification of it is contained in the 10th volume of the "*Repertory of the Arts and Manufactures*."

The last patent which claims our notice, is that granted in November, 1799, to Mr. JAMES BURNS, of Glasgow, builder; for his invention of certain improvements applicable to furnaces, fire-grates, stoves, and chimnies, by which a greater supply of heat may be obtained from a given quantity of fuel; and rooms of every description may be heated more speedily and effectually than by the methods now in use; while they are calculated in a great measure to prevent accidents from women's and children's clothes taking fire, and also to give a degree of cleanliness which cannot be attained where grates and stoves of the common construction are employed. The design of this contrivance is to prevent the heat, generated and thrown out into any room or apartment by combustion, from being unnecessarily wasted by the air of such room being made to maintain the combustion of the fuel in the grate. To effect this purpose, the air supporting the fire in the grates or stoves made with the patentee's improvements, or in other grates to which they may be applied, ought to be conveyed through a tube (which he calls an air-tube) from the outside of the house: or it may be made to pass from the outside of the house between the joists, so as to be brought to the bottom bars of the grate, without communicating with the interior air of the room; while the grates, and other parts connected with them, should be so constructed, that the passage may be closed in a greater or less degree by means of a valve, small door, cock, or any similar contrivance, whenever it is not requisite to supply the fire with cold air from the outside of the house: or, the same object may be attained by directing the tube to a cellar, larder, &c. which will thus be thoroughly ventilated, and prevented from acquiring unhealthy or disagreeable smells.—As our limits will not permit us to specify the constituent parts of Mr. BURNS's design, we refer the reader to the 12th vol. of the *Repertory*, &c. above quoted, where it is minutely described, and farther illustrated by two plates. But we cannot conclude the subject, without stating, that his improvements are affirmed to be an effectual cure for smoky chimnies; and when a fire is lighted in grates of the patentee's construction, it burns up, and becomes lively in a few minutes, without the aid of bellows, and that watchful care which common stoves or grates require.—See also BOILERS, and FIRE-PLACE.

FURROW, in agriculture, a term not properly defined, as it has three or four distinct significations, namely, 1. The soil turned up by the plough; 2. The trench left by this operation; 3. The interval between two ridges; and, 4. The cross drain which receives the rain-water collected by these intervals.—Dr. JOHNSON adds a *fifth*, but he obviously mistakes furrow for *drill*.

According to Mr. MARSHALL, there are three ideas which lay claim to the word FURROW:—1. The trench made by the plough, which may be called a *plough-furrow*; 2. The collateral drains, or an *inter-furrow*; and 3. The transverse drains, or the *cross-furrow*.

The proper formation and disposition of furrows, is an object of the first importance in tillage, to effect the complete draining of water. Hence, in plain fields, the rain-furrows ought to be drawn according to the declivity of the land; but, in rising grounds it will be most proper to direct them to that side which slightly deviates from the horizontal line.

It also deserves to be remarked, that in all situations where it is practicable, especially at the declivities of fields, reservoirs or pits should be dug, or formed, in order to collect the drained water, together with the finest particles of earth, mire, and other ingredients of manure; after the water has subsided, these valuable materials might be easily obtained in a solid form, and thus again employed on the same field, without incurring the additional expence of carriage. We trust, judicious farmers will avail themselves of this hint, and not disregard it with the *stale plea of innovation.*

FURZE, or *Ulex,* L. an indigenous plant, consisting of two species, the principal of which is, the *Europæus,* COMMON FURZE, WHINS, or GORZE, which grows on heaths, road-sides, and pastures. It abounds particularly in the county of Cornwall, where it is very productive, growing to the height of six or eight feet; and flowering from May till late in autumn.

Furze thrives in a light sandy soil, though it grows more luxuriantly in rich land. It is propagated from seed, which is sown in the months of February, March, and April, or in the beginning of May, in the proportion of 6lbs. to an acre; either alone, or with barley, oats, or buck-wheat. But it is not mowed till the year after it has been sown, in the month of October, or somewhat earlier, when it will continue till Christmas, and be fit for use till March.

Furze will grow for several years, and produce from ten to fifteen tons per acre, which, in the feeding of cattle, are equal to the same quantity of hay: hence it is in some places regularly stacked.

This plant is of the greatest utility, especially as food for horses, which, when it is recently bruised, eat it in preference to hay, and even corn. Goats and sheep likewise feed upon the tender tops.—Cows also, that are fed with it, yield nearly the same proportion of pure and untainted milk, as when pasturing on meadow grass. For this purpose, the furze is crushed and reduced in a machine, consisting of a large circular stone, set on its edge, with a wooden axis passing through the centre. One end of this axis is fixed upon a pivot placed in the centre of a circular area, and at the other end is fastened a yoke, to which a draught-horse is attached. As the animal moves, the stone revolves round its axis in a circular groove, or trough of hewn stone, in a manner similar to sugar-bakers, or tanners-mills. In this trough the whins or furze are placed, and bruised by the weight of the stone, as it passes over them: after being well crushed, they are raised up (by means of a three-pronged fork) in the form of a kind of matted cake, which being set upright, is again broken by the wheel revolving on its axis. Thus, the operation is continued, new surfaces being successively presented to the action of the wheel, till the whole is reduced to a soft pulpy mass.—During the continuance of this process, however, it will be requisite to pour sufficient water on the furze, at different times, as, without such precaution, the plant could with difficulty be rendered soft enough to be eaten by cattle. To the furze thus crushed, chopped straw is sometimes added, in the proportion of 1 cwt. to a ton of furze. This operation may be effectually performed by the mills employed in grinding apples, or expressing oil. But, in some parts of England, the prickly points of the whins are merely broken with heavy mallets on blocks of wood, and in this state given to cattle, which eat them eagerly.

Furze is likewise employed for heating ovens, as it burns rapidly, and emits a great degree of heat; when consumed, its ashes are used for a ley, which is of considerable service in washing coarse linen.

This plant is also eminently adapted to the formation of fences, especially on the banks of rivers; as by its close and prickly branches it retains the collected earth, and is more easily procured than faggots. An instance of this fact occurs in the 52d vol. of the *Philosophical Transactions of the Royal Society*, for the year 1761, where it is stated, that locks and *dam-heads* may be raised at one-tenth part of the usual expence, by means of furze; for a thin perpendicular wall of stone and lime, or a wall of deal boards two inches thick, is the dearest part of the whole work. Close to such a wall, on the interior side, is formed a mound of furze, intermixed with gravel, six or seven yards in breadth; and a long beam, equal with the highest part of the mound, is laid on the top. It is affirmed that such a dam cannot be injured by the weight of the water, or the force of the current, nor will the pressure of the mud and gravel cause it to separate, as their weight is suspended by the intertwining of the furze. If, therefore, the beam on the top of the wall be fixed, the whole fence will be firm, and effectually prevent any accident that might happen from the bursting of the bank.

Another purpose to which whins or furze have been applied, is that of a *fence for hedges*. With this view, a bank should be raised five or six feet broad at the top, with a proper ditch on each side, the surface of which ought to be thickly sown with furze-seeds. These will quickly grow, and in the course of two or three years form a barrier, through which few animals will be able to break: such a fence will continue in a state of perfection for several years. But, as the furze advances in size, the old prickles decay; thus leave the lower parts of the stems naked, and afford a passage to animals. To remedy this inconvenience, the bank ought progressively to be stored with new plants, which should never be allowed to ascend to such a height as to become bare below; so that if one side of the hedge be cut down close to the bank, the other half may remain as a fence till the former attains a proper size; when the opposite side may be cut down in a similar manner. Thus, the bank will continually have a strong hedge upon it, without ever becoming naked at the root.—Lastly, the fresh and dried flowers of this plant afford, in dyeing, a fine yellow colour.

There is a variety of this species, which has, within these few years, been cultivated in England, and is called *French Furze.* It thrives on a poor sandy soil, and is cut every third year, in the month of February: the instruments should be sharp, and applied as closely to the ground as possible. An acre of land, sown with this furze, will yield between four and five thousand faggots, which are chiefly consumed in the heating of ovens.

FUSTIC, or Fustock, is the Dyer's Mulberry-tree, or *Morus tinctoria*, L. a native of the West Indies, whence it is brought to this country. It is used by dyers in tinging cloths of a yellow colour; for which purpose it is allowed by the 8th Geo. I. c. 15, s. 10, to

s. 10, to be imported duty-free, excepting a convoy-duty of 7d. per cwt.—It deserves to be remarked, that a small addition of commons It renders the yellow shade darker; sal-ammoniac precipitates an orange-coloured powder, and the supernatant liquid has an *aurora yellow* appearance. Cloth dyed with this drug, without being previously impregnated with neutral salts, or alkalies, acquire a yellow colour of a brownish shade, which undergoes no change in the air; but M. BERTHOLLET observes, that lustre and vivacity of colour can be obtained only, by preparing the stuffs with the usual solutions.—PÖRNER, a German chemist of repute, maintains that alum, and solutions of tin, produce indeed a more lively tint, but which easily fades in the open air;

G.

GAD-FLY, or BREEZE, *Oestrus bovis*, L. an insect with spotted wings, and a yellow breast. It has a long proboscis, with a sharp dart, inclosing two others within it.

These insects particularly infest oxen, in the backs of which they deposit their eggs, and where the maggots are nourished in the winter, till the month of June: during the whole summer, they plague the cattle by means of their darts to such a degree, that the distressed animals are induced to rush into the water for refuge, till night approaches.—We believe that the washing of oxen and cows, in the early spring, with a decoction of tobacco, or any other bitter and acrid plant, would greatly tend to prevent the generation of these vermin.

Gad-flies are also very destructive to flowers and trees, the juices of which they absorb; and likewise injure the roots of trees, which, if not timely prevented, they gnaw so severely, that the stem will languish, and at length perish. The only remedy hitherto discovered is, to dig up the soil at the foot of such flowers or trees, to kill the insects; and to lay on fresh earth; by which means the plants will be speedily recovered, if they have not been too long neglected.

GALBANUM, a gum that exudes from the stem of the *Bubon gummiferum*, L. or Gum-bearing Macedonian Parsley, a native of Persia and different parts of Africa.—The concrete juice is semi-pellucid, soft, and tenacious; of a yellowish-red colour; a strong smell; and a bitterish nauseous taste. The best sort is imported in pale-coloured masses, which, when opened, apparently consist of clear white tears.—This gum is of an emollient and resolvent nature; a tincture prepared of half an ounce of it, dissolved in eight ounces of proof spirit, of which one spoonful is taken every two hours, has been found serviceable in chronic asthmas, and inveterate coughs, where expectoration required to be supported. It is chiefly employed externally, in white swellings, as well as obstructions of the abdomen, and frequently in the form of a plaster, though it is more efficacious in a liquid state.—In hysteric spasms, and inflamed hemorrhoids, we are not acquainted with a better application; but, in the latter case, the painful parts ought to be previously covered with linen rags moistened in lime water, before the tincture is dropped upon them.

GALE, the SWEET, SWEET WILLOW, or DUTCH MYRTLE, *Myrica gale,* L. is an indigenous low plant, growing abundantly on bogs, in gravelly soils, and flowering in the month of May.—It is eaten by horses and goats, but not relished by sheep and cows.

This plant was formerly, by the northern nations, used as a substitute for hops; but unless it be boiled for a considerable time, it is apt to occasion the head-ach.—Dr. WITHERING is of opinion, that from the catkins of this vegetable, if gathered in sufficient quantities, good candles might be manufactured; as, upon boiling those parts in water, a waxy scum may be perceived to rise to the surface.—In the currying of leather, especially the softer kinds, this shrub is of the greatest utility. When reduced to powder, it affords a grateful perfume in the composition ot ointments; and BECHSTEIN asserts, that it is likewise serviceable for the expulsion of *moths* from clothes.—The Norwegians smoke the leaves mixed with tobacco, which they are supposed greatly to improve.—A decoction of the plant is used for the destruction of bugs and other vermin.—In dyeing, the bruised flower-buds and seeds yield a yellow colour.—Lastly, an odoriferous essential oil may be distilled from this aromatic shrub.

The sweet gale may be propagated either by seed, or, more speedily, by the divided roots, which thrive in almost every kind of soil, if it be sufficiently watered.

There is another species of the gale, namely, the *myrica cerifera,* from which the inhabitants of Louisiana prepare *myrtle candles*; it is also used for tanning calf-skins.—It may be reared in gardens by the seed, which produces numerous sprigs; but, as the stems are apt to decay, they ought to be changed, at least once in ten years, by new root-stalks.

GALL, in natural history, signifies any protuberance, or tumor, produced by the punctures of insects on plants and trees of various kinds; but especially the *quercus,* or oak; *cistus,* or rock-rose; *glechoma hederacea,* or ground-ivy; *salix,* or willow; *hieraceum,* or hawkweed; *salvia,* or clary; *veronica,* or speedwell, &c.

Insects deposit their eggs in the leaves or tender branches of plants, the juice of which exudes, and in a short time forms tumors around the punctures or holes. The external coat of this excrescence is dried by the air, and during the winter affords a secure shelter to the inclosed insect, while the soft inner pulp furnishes it with sustenance till the spring approaches, when the fly perforates the shell or rind, and departs.

The best of these galls are those found on oak-trees, and which are thence called *oak-galls*; they are deposited by the *cynips quercus gemmæ,* or oak-bud cynips.—A small portion of galls infused in a weak solution of vitriol in water, imparts to it a purple or violet tint; which, after the whole of the colouring matter is extracted, becomes perfectly black. Considerable quantities of this drug are used in Britain, for the making of ink; dyeing cloths of a black colour, and also for the dressing of leather.—The most esteemed galls are brought from Aleppo in Syria; and by the 8th Geo. I. c. 15, s. 10, are allowed to be imported duty-free, excepting the payment of 4s. 1d. per cwt. for convoy-duty.

Galls have an austere styptic taste, without any smell: they are very powerful astringents, and have, therefore, often been employed in medicine. It is asserted that, by their internal use, in doses of half a dram or more of the powder, intermittent fevers have been cured, even after Peruvian bark had failed.

Gall in *Sheep*, denotes a disorder, with which these animals are affected during the winter, and which is probably occasioned by severe frosts.

Although we have met with no remedy for the cure of this complaint, yet, for its *prevention*, the following useful fact deserves to be recorded. Mr. Ellman, of Shoreham, Sussex, has observed, that by giving his sheep some hay in mornings of hoar-frosts, it preserves them from the *gall*.

GALLING of a Horse's Back, an injury occasioned by heat, and the chafing or pressure of the saddle.—To prevent this painful affection, it is recommended to take the skin of a hind, well furnished with hair, and exactly fitted under the pannel of the saddle, with the hairy side next the skin of the horse.

When, on a journey, a horse's back happens to be galled, a little of the stuffing of the pannel, near the swelled part, should be taken out, and a piece of soft white leather stitched over it, to supply the deficiency. Besides, the sore part of the animal's back should be dressed every evening with an ointment made of the white of an egg and a little powdered alum, beat up together till it acquire the consistence of honey; but, previous to its application, the injured part must be carefully washed with cold water and soap.—Ignorant farriers, in such cases, generally apply *salt-butter*, and strew likewise common salt on the horse's back, to remain there, over night. We, however, are convinced from experience, that such practice is hurtful, and that *fresh* hog's-lard, or butter, is preferable.—In situations where alum cannot easily be procured, a rag dipped in lime-water, or vinegar, may be substituted with equal advantage.

Galling in Medicine. See Excoriation.

GALLON, a measure of capacity, both for dry and liquid articles, containing four quarts, which varies according to the nature of the commodity measured.—Thus, the wine-gallon contains 231 cubic inches, and holds 8lbs. avoirdupois of pure water; the beer and ale gallon contains 281 solid inches, and 10lbs. 3¼ oz. avoirdupois of water; and the gallon for corn, meal, &c. 272¼ cubic inches, and contains 9lbs. 13 oz. of pure water. —*Encycl. Brit.*

GALVANISM, an appellation given to the influence of metals, by mere external contact with the human body, discovered by Prof. Galvani, at Bologna, about ten years since, and which he called *Animal Electricity*.

Certain convulsive motions on the nerves of living and dead animals, may be excited by the application of metallic or other conductors of electricity; but these motions may also be induced, by simply touching the animal fibre with two *different* metals, that are brought in contact with each other at the same moment. This surprizing phenomenon has lately been resorted to, in order to ascertain whether a drowned, suffocated, or otherwise suddenly deceased person, was really or apparently dead. For this purpose, Dr. CREVE, Prof. of Medicine in the University of Mayence, has contrived an instrument formed like a bow, both ends of which are furnished with two small round plates. The whole is composed of two parts made of different metals; one-half of solid zinc, the other of fine silver; or gold and zinc, or lead, tin, and gold. The proportion of the first metal should be less than the other combined with it; namely, the weight and size of the zinc-plate should be less than the opposite one of gold. Both plates are only screwed on the bow, which chiefly consists of silver. But, where this instrument cannot be procured on the spur of the occasion, a small piece of tin or lead, and a silver coin of a moderate size (for instance a shilling, or half-a-crown piece) may be substituted. Although any part of the body may be fixed upon for making the experiment with persons apparently dead, yet the upper arm will be the most proper. The skin, however, in that part where the incision is made, ought to be sound, and not of a gangrenous appearance. The muscles must be cleared of all fat and cellular texture, as far as this be practicable; and the blood is to be taken up by a sponge dipped in water. Next, the muscle should be slightly extended, by stretching the arm; and, in order to keep the lips of the wound separate, the skin ought to be expanded, and the muscular fibres clearly exposed. After these preparatory steps, either the instrument above described, or two loose metallic plates, are to be applied towards the centre of the hollow place or wound made by the incision, and both flat plates brought into perfect contact with the bare muscular fibres. If any irritability exist, or remain, in the system of the subject, the muscular fibres will be contracted and twisted in a manner similar to spasms; or convulsive motions will be evident: every symptom, however, disappears on withdrawing the instrument, and again becomes manifest on re-applying it as before. But no motion whatever will be perceptible, if all irritability be lost or destroyed, in which case the body may be considered as *irrecoverably dead*.—In those instances, where persons have been deprived of life by intense cold, a moderate degree of warmth should be previously applied, with a view to render the limbs flexible. Hence, this experiment cannot with propriety be undertaken, till all other means (see FROST, p. 334) of restoring animation have been *unsuccessfully* employed.

Whatever two metals be chosen, they will, with a few exceptions, produce those remarkable contractions, when applied in the manner before described; but the most powerful are, zinc and silver, or zinc and gold; or in general, zinc, tin, or lead, when used in combination with gold, silver, molybdena, steel, or copper.

These singular phenomena take place in consequence of a mutual communication between any two points of contact, whether more or less distant, in a system of muscular and nervous organs. The extent of this communication may be considered as a complete circle divided into two parts, one of which, comprising the organs of the animal under the experiment, is called the *animal arc*; the other, which is formed by the metals or *galvanic* exciters, is denominated the *excitatory arc*; and consists of more than one piece, of various kinds.

Beside the effects thus produced on the muscles, the impressions made on the organs of sense are equally remarkable. And as the experiments illustrating them may be easily repeated, we shall specify some of the most interesting. For instance, if a thin plate of zinc be placed on the upper surface of the tongue, and a half crown, shilling, or silver tea-spoon, be laid on the lower surface of the tongue, and both metals after a short space of time be brought into contact, a peculiar sensation similar to taste, will be perceived at the moment when the mutual touch happens. If the silver be put beneath, and the zinc upon the tongue, the same sensation will arise, but in a weaker degree, resembling diluted ammoniac, from which it in all probability derives its origin.

If a silver probe be introduced as far as convenient into one of the nostrils, and then be brought into contact with a piece of zinc placed on the tongue, a sensation not unlike a strong flash of light will be produced in the corresponding eye, at the instant of contact. A similar perception will result, both at the moment of contact and at that of separation, if one of the metals be applied as high as possible between the gums and upper lip, and the other in a similar situation with the under-lip, or even under the tongue.—Lastly, when a probe or rod of zinc, and another of silver, are introduced as far back as possible into the roof of the mouth, the irritations produced by bringing the external ends into contact, are very powerful; and that caused by the zinc is similar in taste to the sensation arising from its application to the tongue.

No method has hitherto been discovered, of applying the Galvanic influence in such a manner as to affect the senses of smell, hearing, and touch; though several eminent philosophers have carefully investigated the subject. Nor are the *causes* of these phenomena clearly ascertained; GALVANI and some of his followers, supposing them to depend on the electric fluid, while others attribute them to the influence of various physical agency.

In this state was Galvanism, when in the year 1800, Signor VOLTA, Professor of Natural Philosophy, at Como, in the Milanese, communicated to Sir JOSEPH BANKS, a discovery of the vast accumulation of this power: it was accordingly presented to the Royal Society, from the 2d part of whose Transactions, for 1800, we have selected the following account.

Sign. VOLTA's apparatus consists of a number of copper or silver plates (which last are preferable), together with an equal number of plates composed of tin, or still better of zinc, and a similar number of pieces of card, leather, or woollen cloth, the last of which substances appears to be the most suitable. These last should be well soaked in water saturated with common salt, muriat of ammonia, or, more effectually, with nitre.—The silver or copper may be pieces of money, and the plates of zinc may be cast of the same size. A pile is then to be formed, by placing a piece of silver on a corresponding one of zinc, and on them a piece of wet cloth, or card; which is to be repeated alternately, till the number required be arranged in regular succession. But, as the pieces are apt to tumble down, if their numbers be considerable, unless properly secured, it will be advisable to support them by means of three rods of glass, or baked wood, fixed into a flat wooden pedestal, and touching the pieces of metal at three equi-distant points. Upon these rods may be made to slide a small circular piece of wood, perforated with three holes, which will serve to keep the top of the pile firm, and the different layers in close contact. The moistened pieces should likewise be somewhat smaller than those of metal, and gently squeezed before they are applied, to prevent the superfluous moisture from insinuating itself between the pieces of metal.—Thus constructed, the apparatus will afford a perpetual current of the animal-electric fluid, or Galvanic influence, through any conductor that communicates between the uppermost and lowest plate; and, if one hand be applied to the latter, and the other to the highest metal, a shock will be perceived, which may be repeated as often as the contact is renewed. This shock greatly resembles that given by the torpedo, or *gymnotus electricus*: and, according to the larger size of the metallic plates, the shock will be proportionably stronger. The intensity of the charge, however, is so low, that it cannot penetrate the dry skin; it will therefore be necessary to wet both hands, and to grasp a piece of metal in each, in order to produce the desired effect: its power may be considerably increased, both by an elevation of temperature, and by augmenting the number of pieces that compose the pile. Thus 20 pieces of each will emit a shock, that is very perceptible in the arms; if 100 be employed, a very severe but tremulous and continued sensation will extend even to the shoulders; and, if the surface of the skin be broken, the action of the Galvanic influence will be uncommonly painful.

The sensation of a flash, or shock with this apparatus, does not materially differ from that produced by two simple plates; but it may be effected in various ways, especially if one or both hands be applied in a wet state to the lowest plate of the pile; or any part of the face be brought in contact with a wire communicating with the top piece. Farther, if a wire be held between the teeth, so as to rest upon the tongue, that organ, as well as the lips, will become convulsed, the flash will appear before the eye, and a very pungent taste will be perceived in the mouth.

Many other curious facts have transpired on this interesting discovery; but, as they have not been hitherto applied to medical purposes (though we believe that *Galvanism* may be safely, and perhaps successfully, resorted to, in *paralytic* and other cases, where the muscles require excitement), we shall content ourselves with referring the curious reader to Dr. FOWLER's "*Essay on Animal Electricity*," 8vo.;—for a further account

count of Signor VOLTA's discovery, to the volume of the "*Philosophical Transactions*" above cited; and to the 4th vol. of Mr. NICHOLSON's "*Journal of Natural Philosophy*:" and, for later discoveries, to the 1st vol. of Dr. GARNETT's "*Annals of Philosophy*," &c. 8vo. Cadell and Davies, 1801, where the subject is perspicuously treated.

GAMBOGE, a concrete vegetable juice, of a gummy-resinous nature. It issues from the *Cambogia gutta*, a native of Cambia, in the East Indies; whence it is imported in large cakes or rolls. The best sort is of a deep yellow colour; is divested of all smell; and has very little taste.

As a pigment, gamboge makes a beautiful yellow, which is much used by painters. When taken as a medicine, it operates violently both upwards and downwards. It has been used in dropsies with cream of tartar, or jalap, or with both, to accelerate their operation: it is also recommended to be taken for the expulsion of the tape-worm, in doses of fifteen grains, early in the morning; and, if the worm be not expelled in two or three hours, this powerful dose is said to have been repeated with safety and with success, even to the third time, and in persons of delicate habits.—Great precaution, however, is requisite in the use of this precarious and active medicine; but, if accidentally too large a dose of it should have been swallowed, the most effectual antidote will be copious draughts of a solution of pearl-ashes in water.

GAME, in general, denotes any sport or diversion that is performed with regularity, and subject to certain rules.

Games are usually divided into those of *exercise*, such as leaping, playing at tennis, &c.; and into those of *hazard*, such as back-gammon, &c. which latter ought, in justice to the persons addicted to them, to be completely abolished.

Having already treated of the more active games, under the article EXERCISE, we shall at present only point out such as are peculiarly detrimental to the health of children.

1. *Bending* of the head backwards should be carefully avoided, to prevent young people from tumbling over: besides, the muscles of the abdomen become thus unnaturally extended, and frequently dispose such hazardous adventurers to ruptures.

2. *Jumping* wantonly from, or to, a considerable height, ought to be either prohibited, or undertaken with the greatest caution, in order to avoid violent concussion, and sudden tension of the muscles. The juvenile sportsmen should, therefore, be taught to make such exertions with their knees somewhat inflected, as to reach the ground first on the points of the toes, and then gradually to drop on the soles of the feet.

3. Children are uncommonly fond of displaying their dexterity in *lifting* one another, and even weights far superior to their strength; a practice that ought to be seriously discouraged: for, while they are in such postures, every nerve is necessarily strained; respiration is impeded; and dangerous accidents may ensue.

4. All *partial exercise* tends to give the body a crooked form, and should therefore be allowed only at certain times, and with moderation; as, under these restrictions, it is even salutary; but, if continued to excess, it is attended with

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the most injurious effects. Hence it would be a judicious measure to teach youth, at an early period, the use of both arms alike, and to make them acquainted with such games as contribute to that purpose.

5. *Sedentary diversions,* and long standing, are extremely prejudicial to the straight growth of children; for, as the spinal column and legs are too feeble to support the additional weight of the reclining part of the frame, the vertebræ yield to one side, and often occasion incurable distortions.

If these precautions were more strictly observed, and both male and female children instructed to beware of dangerous postures and leaps, as well as of raising and carrying heavy burthens, how many fatal accidents might be avoided! Yet, we are by no means advocates for rendering them unnecessarily timid. There is a medium, which every prudent guardian will easily discover; and to this we would call the attention of parents—happy, if we could thus add our mite towards introducing more rational, and less hazardous practices.

GAME, among sportsmen, denotes such birds, beasts, or other eatable animals as are taken or killed by fowling or hunting.—For its physical properties, the reader will consult the separate articles of DEER, DUCK, HARE, &c.

Different penalties have been imposed, by various acts of parliament, on all unqualified persons, who may be detected in taking away or killing game, or in keeping greyhounds and other dogs, together with engines for catching hares, or other game; but, as they are too numerous to be specified here, we can only refer to the laws themselves, or to the abstract of the acts of parliament, published in *Kearsley's Tax-Tables,* 12mo. 1801.

GAMING, the art of playing any game of chance; for instance, dice, E O, and Pharo-tables, &c.

Gaming has at all times been regarded as pernicious to the morals of society, and is therefore prohibited under severe penalties. Thus, by the 16th CAR. II. c. 7, if any person lose by playing or betting, more than 100l. at one time, he is not compellable to pay it; but the winner incurs a forfeiture of *treble* the value, one moiety of which belongs to the King, and the other to the informer. By the 9th ANN, c. 14, all bonds, &c. given for money won at play, or lent for the purpose of play, are utterly void; and, if any person lose at one time more than 10l. he cannot sue the winner; or, if any one commit a fraud, and win more than 10l. or any valuable article, he is liable to be indicted, and incurs a forfeiture of five times the value; beside which, he is to be deemed infamous, and liable to suffer such corporal punishment as is inflicted in cases of perjury.—By the 18th GEO. II. c. 34, the stat. 9th ANN is farther enforced; and, if any person is convicted of losing 10l. or 20l, at any sitting within twenty-four hours, he shall forfeit five times the sum. There are likewise various other penalties, which our limits do not permit us to specify.—Domestic readers have neither leisure nor inclination to spend their valuable time in the iniquitous practice of *gambling*: and, as those idle miscreants of society who waste their days in *deep* games, at the *ultimate* expence of the industrious husbandman, are seldom detected or punished, it were sincerely to be wished, that our salutary laws could be more rigidly enforced. But little prospect remains for the suppression of that vile amusement, which has lately spread its baneful influence even among women of rank and fashion; since they find themselves encouraged and supported by a powerful phalanx, composed of great and wealthy, but unprincipled men, who consider their homes as gloomy abodes; in which they cannot devote themselves to every scene of riot and dissipation.

GANGRENE, an intense degree of inflammation; in which the part affected grows livid, soft, little sensible, and is frequently covered with vesicles containing ichorous matter. But, when the part becomes blackish, flaccid, easily lacerable, cold, insensible, and emits the smell of putrid flesh, so that the corruption quickly spreads, it is then called *sphacelus*.

Persons of a good habit of body are seldom affected by a gangrene; though, even in them, it may accidentally be induced by contusion, long-continued pressure, or by whatever destroys the texture of a part, and deprives it of its nourishment. Thus, in cold climates, severe frosts frequently occasion this malady, by impeding the circulation.—In rheumatic constitutions, especially those advanced in years, the feet are first afflicted with pain, while on the inner side of the small toes, livid spots appear, from which the skin soon separates. By degrees the foot swells, and the toes become mortified.

As soon as there is reason to apprehend, from the unnatural heat of the part affected, and the violence of the fever, that a gangrene will ensue, the patient ought, without loss of time, to apply for professional advice, as bleeding may perhaps be useful: meanwhile, his diet and other treatment should be similar to that prescribed under the head of INFLAMMATION.

When an inflamed surface assumes a gangrenous appearance, while the patient is weak, and the pulse low, it will be advisable to resort to a nourishing diet, together with the free use of generous wine, and whatever else is calculated to invigorate the system. Peruvian bark in powder is usually given, in as large quantities as the patient's stomach can support. According to later experience, however, musk conjoined with the volatile salt of amber, affords a still more powerful remedy, for checking the progress of gangrene: eight grains of the former, with five of the latter, have been administered in the form of pills, every three hours, with evident success, after the bark and valerian had been given without effect.

In gangrenes arising from intense frost, the parts ought to be immersed in very cold water, or rubbed with snow; for warm applications will be attended with speedy mortification. A similar practice should be adopted, if the whole body has become torpid, or rigid, from the severity of the weather; but, in this case, the water ought to be gradually changed for some of a warmer temperature.—Frictions with salt will also be of considerable service; and, if the whole body be benumbed, it will be requisite to administer first a glass of cold wine, or other cordial, and afterwards some warm wine, either alone or with spices.

It, however, frequently happens, that a mortification takes place, though no efforts or attention be neglected. In such unfortunate situation, we can by no means approve of extravagantly cutting and dissecting the parts, as soon as they appear gangrenous; but, where the affection extends very deep, it will be beneficial to scarify the diseased spots, and to remove part of the putrid muscular fibre.

Various external applications have been recommended, as auxiliary means of curing a gangrene; but the following deserve particular notice: Dr. HAHNEMAN has, with singular success, employed a strong decoction of oak-bark, namely, six ounces of it, in coarse powder, boiled in a quart of water till it is reduced to one pint: four or six double rags are dipped in it, and applied in a cold state to the diseased part, every half hour, but the compress must every time be made of *clean* rags.—Others have, with equally good effect, resorted to gentle stimulants, generally consisting of a weak solution made of one dram of sal-ammoniac in two ounces of vinegar, and six of water: the degree of stimulus may be increased, or diminished, by varying the proportions of the salt.

Lastly, when a separation of the mortified part, and a discharge of the corrupt matter, have been effected, either by the use of external or internal remedies, the remaining sore is to be treated as a simple purulent ulcer, and may be healed in the same manner.

GARDEN, a piece of ground, laid out, cultivated, and ornamented with a variety of plants, fruits, and flowers.

Gardens are generally divided into three classes: 1. The flower-garden; which, being designed both for pleasure and ornament, ought to be in the most conspicuous situation. 2. The fruit-garden, or orchard; and, 3. The kitchen-garden, which being calculated for utility, should be planned in more distant situations. The two latter, however, are at present usually combined, as they equally require good soil and exposure.

The principal circumstances that merit attention in the laying out of gardens, are, situation, soil, water, and prospect; the most eligible of which we shall briefly state, referring the reader to the article KITCHEN-GARDEN, for a more particular account of the management of such ground as is designed for the supply of culinary vegetables; and to that of ORCHARD, for the treatment of fruit-gardens.

1. The *situation* ought to be neither too elevated, nor too low: for if a garden be too high, it will be exposed to the attacks of the winds, which are very detrimental to trees; and, if it be too low, the dampness, the vermin, and venomous creatures which breed in ponds and marshy places, contribute much to the unwholesomeness of the spot. It is true, as Dr. DARWIN has observed, that low situations are favourable in some respects, on account of their superior warmth, and of their being more sheltered from the cold north-east winds, which, in this climate, are accompanied with frost; and from the boisterous south-west winds, that are very violent, and during summer, frequently injure the more delicate plants, by dashing their branches against each other. But in low situations, Dr. D. adds, the fogs in the vernal evenings moisten the young shoots and early flowers of trees, and thus expose them to the injuries of the frosty nights which

succeed them, and which they generally escape, when placed in more elevated ground.—The best site, therefore, is on a gentle declivity, especially if it abound with springs, and the land surrounding the house be level: for the air will then be temperate, and the water descending from the hill, whether from springs or rain, will not only contribute to fertilize the soil, but also supply fountains, cascades, &c.; it will be farther useful for irrigating the adjacent valley, which, if the water be not suffered to stagnate, will thus be rendered fruitful and salubrious.

2. A good *soil* is an object of great importance. This may be ascertained, by observing whether there be any heath spontaneously growing on it, or other weeds that indicate a poor soil. But, if the land be covered with rich grass, fit for pasture, it will be advisable to investigate the depth of the vegetable earth, by digging holes in various parts, 6 feet in width and 4 in breadth: thus, if 2½ or 3 feet in depth, of good mould, appear on the surface, the soil may be considered as excellent.—Good land must neither be too stony, nor too hard for the spade; nor too dry, damp, sandy, or too light; lastly, neither too strong, nor clayey, as such soils are ill calculated for gardens.

3. The next requisite is *water*; the want of which is one of the greatest inconveniencies in gardening: nor should it be taken from cold springs; as river-water, or that from stagnant pools, is more proper, especially after it has been exposed to the rays of the sun during the day.

4. The *prospect*, though by no means an essential point, constitutes one of the greatest charms of a garden, which, if it happen to occupy a low and confined situation, is not only disagreeable, but also detrimental to the health of those who spend part of their time in such places.

In laying out a garden, its size ought never to exceed the ability or wants of the proprietor. The beauties of Nature should likewise be diligently studied; as gardens will continue to please in proportion as they approach to her design. Hence the several parts ought to be sufficiently diversified; and the general disposition of them accommodated to the inequalities, as well as the different situations, of the soil. Nor should the number and species of trees and shrubs be disproportioned to each part; nor any objects that may conduce to ornament, be excluded from the view of the garden. Lastly, in designing these delightful spots, the constant aim should be to unite all that is natural, grand, and noble.—The curious reader, who is desirous to obtain more particular information, may with advantage consult Mr. WHEATLEY's classical work, entitled "*Observations on Modern Gardening, illustrated by descriptions*," 8vo. 3s. 6d. which is calculated alike to entertain and instruct.

GARGET, a disease incident particularly to black cattle: it is attended with a swelling of the throat, tongue, and the contiguous parts; and supposed to arise partly from over-heated blood, partly in consequence of eating poisonous herbs.—To prevent an attack of this disorder, it has been recommended to bleed the animals in the spring. But, if it has already taken place, the mouth ought to be examined, and washed with vinegar. Others advise an incision to be made with a knife, below the tongue, in order to let out the blood and water; afterwards to wash the wound with a solution of salt and alum, in vinegar. This, however, appears to us a hazardous practice, of which we have had no experience.

GARGIL, a distemper in geese, which, by stopping the head, frequently proves fatal.—To effect a cure, nothing more is requisite than to take three or four cloves of garlic, pound them in a mortar with sweet butter; then form them into little balls, and give them to the animal fasting; but no food should be allowed them till two or three hours after taking this remedy.

GARGLE, or GARGARISM, is a liquid form of medicines used in disorders of the mouth, gums, &c.

Gargles are peculiarly useful in sore throats and fevers: they are preferable to many other remedies that are given on the spur of the occasion, as they may be easily and expeditiously prepared.—Thus a gargle for softening and cleansing the mouth and gums may be procured, by simply mixing a small quantity of barley-water and honey, acidulated with a little vinegar.

An *attenuating gargle,* consisting of 6 ounces of water, ½ an ounce of honey, and a dram and a half of nitre, will be of considerable service in inflammatory fevers and quinsies, and also for cleansing the tongue and mouth.—A decoction of sage, sweetened with honey and sharpened with vinegar, is well calculated to answer a similar purpose.—With the same intention, the late Sir JOHN PRINGLE recommended a decoction of figs in milk and water, with the addition of a little sal-ammoniac, as an excellent gargle, especially for strangulations in the fauces.

In putrid sore throats, where the symptoms are urgent, the tendency to putrefaction is great, and the patient's breath offensive, the following composition will be found serviceable: Let 12 ounces of barley-water be mixed with 6 of bruised contrayerva-roots, while the former is boiling. The liquor is then to be strained off, and 2 ounces of white wine vinegar, 1 ounce of tincture of myrrh, and 6 drams of the best honey are to be added. If the parts surrounding the gullet happen to be affected to such a degree as to render it painful for the patients to employ this composition themselves, it may be injected into the mouth, by means of a small syringe.

An *emollient gargle* may be made, by boiling an ounce of marsh-mallow root, and two or three figs in a quart of water, till it is reduced to one pint, when the liquor is to be strained off: it is useful in fevers, where the tongue and mouth are parched, in order to soften those parts and to promote a discharge of the saliva.—Lastly, the *common gargle* is prepared, by mixing 6 ounces of rose-water, with ½ an ounce of syrup of Clove July-flowers, and acidulating this compound with spirit of vitriol: it is employed for cleansing the mouth and gums, and operates as a gentle repellent; tho' we believe a mixture of water and vinegar is not inferior to that elegant composition.

GARGUT, a distemper affecting all kinds of mamillary animals, especially cows when full of milk. It is occasioned by this fluid being coagulated in their bags or udders, so that it becomes corrupted and breaks out, discharging a noisome and ulcerating matter. The chief cause of the injury is owing to the neglect of milking, or *sucking down* in proper time; but it may also arise from too high feeding. Cows and sheep, when thus affected, may be cured; because these animals are tractable, and will suffer the diseased parts to be anointed with emollient applications; remaining quiet, while their teats are gently drawn down. Instances have occurred of cows, which were, even after they had lost half their bags, recovered by the simple methods above mentioned, especially by gently squeezing out the corrupted milk from the two sound teats. But sows can seldom be cured, on account of their intractability; and their pigs will never relieve them by sucking, after they have once tasted the vitiated milk: hence they necessarily perish, in consequence of their unlimited high feeding.

GARLIC, or *Allium*, L. a genus of plants comprising 54 species, seven of which are indigenous: of these, the following are the principal:

1. The *oleraceum*, Streaked Field-garlic, or Wild Garlic, which is perennial; grows in pastures, meadows, and among corn; and produces whitish-green blossoms in the month of July.—It is eaten by cows, goats, sheep, and hogs:—the tender leaves of this species are usually boiled in soups, or fried with other herbs, and form an wholesome article of food.

2. The *ursinum*, Broad-leaved Garlic, or Ramsons, which is also perennial; grows in woods, hedges, and meadows; and produces large white flowers, that blow in the months of May and June. This species is eaten by cows, but it communicates its flavour to the milk and butter, to such a degree as to render those articles offensive during the spring.—It affords an excellent remedy for dispelling rats and moles; nor will this plant suffer any vegetable set near it to thrive:—an infusion of it in brandy is esteemed, according to Mr. PENNANT, a good medicine for the gravel.—The inhabitants of Kamtschatka find it of great service in removing the scurvy, even in the most advanced stages.

3. The *Schœnoprasum*, Chive, or Chived Garlic, abounds in meadows and pastures; and flowers in the month of June. It is propagated by parting the roots, and was formerly in great request as an ingredient in salads, during the spring; but it has been latterly neglected: its taste, smell, &c. are milder than those of the common onion.

Beside these species, which are but little cultivated, there is another, that deserves to be noticed, viz. the *sativum*, or Common Garlic. It is a native of Sicily, whence it has been introduced into our gardens.—This is a very hardy plant, and will thrive in almost every soil or situation. It is propagated either by the roots or seeds: the former ought to be set in autumn, so that they may strike firmly in the ground before the spring; which is requisite to make them flower vigorously the ensuing summer. When raised from seeds, it should be sown on a border of common earth, either in autumn, shortly after the seeds are ripe, or in the succeeding spring: they require only to be kept clear of weeds; and, in the following autumn, may be transplanted to the spot where they are destined to remain.

Every part of this plant, but especially the root, has a pungent, acrimonious, and almost caustic taste, with a peculiarly strong, and, to many persons, offensive smell. Several nations, however, such as the Russians, Poles, and Hungarians, are very partial to it; and the Jews eat it to excess. Its odour is extremely penetrating and diffusive; and, when the root is taken into the stomach, its scent is communicated to the various excretions, and perspires through the pores of the skin.—The juice of this pungent root may be employed with advantage, for cementing broken glass and china, or porcelain.

Garlic differs from the onion, only by being more powerful in its effects: they are both stimulants; assist digestion; relieve the bowels; expel flatulency; and are beneficial in disorders proceeding from too great a degree of viscidity: they also increase the appetite; and, as their stimulating properties are diffused over the whole system, they may be considered as useful condiments with the food of phlegmatic persons, or those, whose secretions are in a languid state; but their use may prove very pernicious to individuals who are liable to inflammatory complaints, or in whom a great degree of irritability prevails.

The medical properties of garlic are various: it has long been in estimation as an expectorant in pituitous asthmas, and other pulmonary affections that are not accompanied with inflammation. It is also frequently of service in the dropsy; at the commencement of which it has been especially recommended by SYDENHAM, in the quantity of one or two drams in substance, for a dose.—Externally applied, it blisters the skin. When made into an unguent, it is said to discuss cold tumors, and has been celebrated for its efficacy in cutaneous complaints:—in certain states of deafness, a small clove or bulb of the root, when enveloped in gauze, or muslin, and introduced into the ear, has been found an efficacious remedy.

GARTER, a ligature employed for fastening or tying up stockings.

Though the use of garters be sanctioned by custom and fashion, it is by no means to be recommended, either above or below the knee; for the parts compressed acquire an unnatural hardness; and every exertion, either in walking or riding, is attended with increased fatigue. Dropsies of the legs and thighs also frequently arise from this unsuspected cause;—hence, likewise, many persons stumble, fall, and dislocate, or otherwise materially injure the knee-pan. Such are the inconveniencies attendant on the use of garters: they might, however, be easily prevented, by simply fastening the stockings to the waste-band, by means of tape.—Trifling as this alteration may probably appear, it is of real importance to all, especially to those who are troubled with swelled or ulcerated legs, as well as to invalids and valetudinarians in general: for we are fully persuaded, that by the adoption of the expedient before suggested, many unfortunate accidents may be easily obviated.

GAUZE, in commerce, is a thin transparent stuff, sometimes woven of silk, and sometimes only of thread. In preparing the silk for making gauze, it is twined round a wooden machine, about six feet in height, in the middle of which an axis is placed perpendicularly, with six large wings. On these, the silk is wound off the bobbins, by the revolution of the axis; and, when it is thus placed round the mill, it is taken off by means of another instrument, and wound on two beams. The silk is then passed through as many small beads as it has threads, and is thus rolled on another beam, in order to supply the loom.

Gauzes are either plain or figured: the latter are worked with flowers of gold and silver, on a silk ground, and are chiefly imported from China.—No silk gauzes can, during the present hostilities, be imported from either France or Holland: formerly they paid a duty of 21 per cent. on the value of the goods.—Within these few years, excellent silk and other gauzes were manufactured at Paisley, in Scotland; but, as this elegant article of luxury has lately much declined, the silk is now employed for other more solid purposes.

GEM, a general name applied to all precious stones, which are divided into two classes; 1. The *pellucid*, or such as are clear, elegant and beautiful fossils, extremely hard, and of uncommon lustre; 2. The *semi-pellucid* gems, which are found in small detached pieces, and are composed of crystalline matter debased by earth: they are, nevertheless, of great beauty and brightness, and somewhat transparent.

The value of gems depends principally on their *hardness* and *colour*. With respect to the former, the diamond is allowed to be the firmest, and can only be polished, or cut, by its own powder: next to it, the ruby, sapphire, jacinth, emerald, amethyst, garnet, onyx, jasper, agate, porphyry, and marble are classed in the order we have enumerated. The same classification prevails in point of colour: the diamond is universally esteemed on account of its brilliancy; the ruby for its purple; the sapphire for its blue; the emerald for its green; the jacinth for its orange; the amethyst for its carnation; the onyx for its tawney; the jasper, agate, &c. for their vermillion, green, and variegated colours; and the garnet for its transparent red.

The art of imitating gems is very difficult to be attained; and, as it can be practised only by those curious persons, who possess both leisure and means, we shall not enter into a detail. The same apology will apply to the imitation of what are called *antique-gems*; many valuable impressions of which have been made by Mr. TASSIE: hence we cannot omit to mention Mr. RASPE's "*Account of the Present State and Arrangement of* Mr. JAMES TASSIE's *Collection of Pastes*," &c. 8vo. 1786, where the inquisitive reader will find an interesting subject judiciously treated and explained.

GENERATION, in physiology, implies the propagation of the species, whether in plants, insects, fishes, or other animals.

Having referred the reader to this article, under the head of "ANIMALCULE," (vol. i. p. 57), we are obliged only to explain the term, without entering into speculative theories, none of which has hitherto been sanctioned by general authority.

GENERATION, is also used, in Scripture, for *genealogy*, or the series of children issued from a common parent. More frequently, however, is the word generation employed at present, to signify an *age*, or the average period of human life. Hence we say, "to the third and fourth generation;" in which sense historians generally compute the space of about 33 years to each generation. Thus, HERODOTUS divides a century, or 100 years, into three generations; a calculation that appears to be tolerably correct, from the latest results of political arithmetic.

GENTIAN, the COMMON, YELLOW, or RED; *Gentiana lutea, v. rubra*, is a native of the Alps, whence it was introduced into this country. It is, however, seldom cultivated in our gardens; the root, which is employed in medicine, being imported from the mountainous parts of Switzerland and Germany.

Gentian is one of the principal bitters of European growth, and has been found of considerable service in fevers, and those complaints which arise from weakness of the stomach, and acidity in the first passages. Some years since, a poisonous root was brought to London among parcels of gentian, the use of which occasioned violent disorders, and, in two cases, death. This spurious root is conjectured to have been the *Aconitum anthora*, a species of the wolf's-bane, which may be easily distinguished from the gentian, by its smell, whitish colour, and want of bitterness; whereas, the true gentian is externally brown, and of a yellowish, or bright-red colour within; has no scent, and, at first, a sweetish, but immediately after, a very bitter and pungent taste.—The dose of this drug, in powder, is from 10 to 40 grains; though it is more frequently taken as the chief ingredient in bitter wines, tinctures, and infusions.

GERANIUM: See CRANE'S BILL.

GERMANDER, or *Teucrium* L. a genus of plants consisting of sixty-eight species, three of which only are natives.

1. The *scorodinia*, Wood Germander, or wood sage, which is perennial; grows in woods, heaths, thickets, and hedge-banks; and flowers in the month of July. It has a bitter taste, and in smell resembles hops, with a small mixture of garlic: in the Isle of Jersey, it is used in brewing, as a substitute for hops.

2. The *scordium*, or Water Germander, which is also perennial; grows in damp and marshy situations; and produces purplish flowers in the months of July and August. It is eaten by sheep and goats, but refused by horses, hogs, and cows; though the latter will eat it when impelled by hunger, in consequence of which, their milk acquires the flavour of garlic.—The fresh leaves of the water germander are bitter, and somewhat pungent; when pulverized, they have been used for the expulsion of worms;—a decoction of the whole plant is said to be a good fomentation in gangrenes.

3. The *chamædrys*, or Common Germander, is found in the borders of corn-fields that are remote from houses, in ruins, and upon ancient walls; it produces reddish purple flowers, which blow in the month of June or July. The leaves and tops of this species have a moderately bitter taste, accompanied with a weak aromatic flavour. It was formerly in great esteem as an aperient and corroborant; it is strongly recommended in agues,

rheumatism, and gout, especially to weak and relaxed constitutions. —In tanning, it has been employed with advantage by Bautsch.

There is an exotic species of the germander, viz. the *Teucrium marum*, or marum germander, which is a native of Spain, whence it has been introduced into our gardens, under the name of *Cat-thyme*. It has received this appellation, from the uncommon fondness which cats instinctively display for this vegetable. Its leaves and tender branches, on being rubbed between the fingers, when fresh, emit a volatile aromatic odour, which excites sneezing; but to the taste they are somewhat bitter, with a sensation of heat and acrimony.

From the active powers of the marum germander, it has been highly recommended in many diseases that require medicines of a stimulant, aromatic, and deobstruent quality.

GERMANDER, the Wild, or Germander-Speedwell, *Veronica chamædrys*, L. an indigenous perennial plant, growing in pastures and the sides of hedges; and flowering in May. It is eaten by cows, goats, sheep, and horses, but refused by hogs.—The leaves of this plant have been recommended as a substitute for *tea*; but it is chiefly used as a mild astringent.

GID, a distemper to which hogs are subject. It is occasioned by their feeding too eagerly on buck-wheat, clover, or other rich succulent plants; and is somewhat similar to the disorder in horses, called the *staggers*; as the diseased hogs are affected with violent giddiness, sometimes stumbling and falling at every step; at others, sitting on their haunches, they squeak for several minutes successively, with great violence. The only remedy hitherto known for the cure of this malady is, to drive the animals about for a considerable time (as they are too intractable to be treated *medically)*, by which means an abundant evacuation will be promoted, and they will be effectually relieved. It is, however, necessary to adopt this rough treatment, as soon as any of the first symptoms appear; for, if neglected, their intestines become inflamed; their bodies violently distended; and a painful death will be the consequence.

GILDING, the art of spreading, or covering any substance with gold, either in leaf, or in a liquid state.

This art was known to the ancients, though it has only within the last two or three centuries been brought to the highest degree of perfection. Consistently with our plan, we cannot enter into the various branches of gilding, the knowledge of which is confined to a particular class of artists; yet, as there are many who delight in making experiments, we shall subjoin a simple method, that may be easily practised, and will not affect the health of individuals.

Let gold be dissolved in *aqua-regia* (which see): in this solution pieces of linen should be immersed, then dried, and burnt to ashes; these should be finely pulverized, and rubbed on silver, by means of a wet linen rag, or more properly with a moistened piece of cork: thus, the particles of gold they contain will be deposited, so as to adhere firmly to the silver. The remaining ashes are next to be washed off, and the surface of the silver that does not appear gilt, is to be burnished with a blood-stone, till it acquires the colour of gold.—This method, which is easy, and consumes a very small portion of gold, is usually employed for the gilding of trinkets, spoons, snuff-boxes, and other articles.

Gold is likewise used for ornamenting glass, porcelain, and other vitrified matters; to the surface of which (being very smooth, and susceptible of a perfect contact), the gold leaves closely adhere. The pieces are then exposed to a certain degree of heat, and slightly burnished, in order to give them lustre.

However ingenious and pleasing to its amateurs, the art of gilding is very detrimental to the health of the persons who practise it, especially in the more complex branches, where mercury and other noxious minerals are employed over fires, and cannot fail to produce the most pernicious vapours. Gilders by profession are particularly liable to suffer from these exhalations, the influence of which, however, might be effectually prevented, by allowing a continual current of air to perflate the apartment, where the process is managed. Such an arrangement may be easily made, by merely opening the *upper window*, or a door, which will admit fresh air to pass through the room. By this simple expedient, the tremors, paleness, and sickness usually attendant on such operations, will be completely averted.

GILEAD, the BALSAM, or BALM of, is a gummy substance that exudes from the bark of the *Amyris Gileadensis v. Opobalsamum* L. a native of Arabia Felix.

The balsam formerly imported into Europe, is obtained chiefly by incision; but the quantity afforded by one tree is so very small, and the collecting of it is attended with so much trouble, that the genuine balm is seldom, and perhaps never exported in a commercial way. It is of a bitterish aromatic taste, an acidulous fragrant smell, and of a yellowish or greenish colour.—Among the Turkish women, it is in high reputation, both as a cosmetic and as a specific for almost every disorder; on which account it is valued at so extravagant a price, that it is extremely difficult to procure it in a genuine state, because it is presented only to Sovereign Princes. Hence, in this country, it is now entirely superseded by the balsams of Canada and Copaiba, which are equally efficacious. We have inserted this account, with a view to caution and undeceive the credulous, who may be apt to imagine that *any* base compound offered to the public, under specious pretensions, is the real *Balm of Gilead*, which is frequently mentioned in Scripture.

GILL, See GROUND-IVY.

GIN, sometimes called GENEVA, or HOLLANDS, is a malt spirit distilled a second time with the addition of juniper-berries.

These berries were at first added to the malt before it was ground; so that the spirit obtained from both, by distillation, possessed the aromatic flavour of the berries, and was much superior to that produced by any other method. At present, the juniper-berries are totally omitted; and the noxious spirits vended under the name of *gin*, acquire their flavour by distilling them with oil of turpentine, the taste of which in a slight degree resembles that of the juniper-berries, but possesses none of their valuable properties.

This pernicious spirit is subject to very heavy duties; notwithstanding which, the odious practice of drinking it has increased to so great a degree, that we apprehend neither duties nor penalties will impede its progress. Nor is it immediately confined to the poorer class: persons whose stations in society require a very different conduct (and among these may be ranked too many of the softer sex), defile their mind and constitution by this vicious and vulgar custom. Independently of the disorders occasioned by the drinking of gin, it generally makes such ravages on the countenance, as to destroy that grace for which British women have been celebrated. Such, however, is the prevalence of habit, that *gin-drinking* will never be effectually abolished, or at least re-banished to the apothecaries' shops, which formerly enjoyed the exclusive privilege of selling that liquor, till the duties imposed on it become so heavy as to preclude its disposal *in drams*: and we trust that every impartial person will cordially unite with us in wishing, that the day may not be far distant, when indulgence in this vice will be regarded with universal detestation.

GINGER, the COMMON, or *Amomum Zingiber*, L. is a native of the East Indies, whence it was transplanted by the Spaniards to the West India Islands, from which Europe is chiefly supplied with its spicy root.

Ginger is a perennial shrub, which grows about a yard high; it was introduced into England in the year 1731, and is still reared in the gardens of the curious. Its propagation is effected by parting the roots in the spring, planting them in pots of light rich earth, and placing them in a hot-bed of tanner's bark, where they are to remain.

The dried roots of this plant are either white, from the lime employed to prevent their destruction by vermin; or blueish, brown, or black, according to the soil in which they have been cultivated: they are of eminent use, both for culinary and medical purposes, affording one of the most wholesome and agreeable spices. Hence ginger in entire pieces is often boiled in beer, and drunk by persons who are obliged to spend part of their time in cold, open air. It is more immediately serviceable in cold flatulent colics; in laxity and debility of the stomach and intestines, especially in torpid, phlegmatic constitutions; in order to induce a brisker action of the vessels; for it is not so heating as the spices of the pepper kind, though its effects are more durable.

GINGER-BREAD, is a composition prepared of flour, and sugar or treacle, to which is added a certain proportion of ground ginger, whence it has received its name.

Ginger-bread, well baked, may occasionally be of service to travellers, if a small portion of it be taken early in the morning, and on an empty stomach; but it ought seldom, or very sparingly, to be given to children, whose stomachs it materially injures, especially when ornamented with *leaf-gold*, as it is erroneously called; though the glittering bait consists of *Dutch gold*, that is, brass or copper reduced to the fineness of gold-leaf, and which is one of the most vehement poisons. From this fruitful source arise gripes, obstipations of the bowels, obstructions of the mesenteric glands, and other fatal disorders that frequently torment infants, and which there is great reason to fear, have carried many helpless victims of indulgence to an untimely grave.—Parents, therefore, cannot be too watchful in this respect; and it were much to be wished, that the pernicious practice of gilding ginger-bread might be prohibited, by public authority.

GINSENG, or *Panax quinquefolium*, L. is an exotic plant growing wild in North America.

The dried root of ginseng, as imported into this country, has a mucilaginous, sweetish taste, similar to that of liquorice, but accompanied with some degree of bitterness, and a slight aromatic warmth, with very little odour. The Chinese ascribe extraordinary virtues to this plant, and consider it as a sovereign remedy in almost every disease to which they are subject. No proofs, however, of its wonderful efficacy have occurred in Europe. Nevertheless, it is often used as a tonic, antispasmodic and stimulant, in doses from 20 to 60 grains, in powder.—Nor do we believe that the celebrated *ginseng tea* possesses any peculiar properties, excepting those of a nauseous taste and loathing, while the warm water swallowed with it debilitates the stomach.

GLADIOLE. See Flowering RUSH.

GLADWYN, or Gladdon. See Stinking FLOWER-DE-LUCE.

GLANDERS, a disorder in horses, which manifests itself by a corrupt slimy matter running from the nose: according to the degree of malignity, or the continuance of the infection, the discharge is either white, yellow, green, or black, and sometimes tinged with blood.

The cause of the glanders is variously attributed, by some to an infection; by others, to a diseased state of the lungs, the spleen, or the brain. When the distemper has continued till the evacuated matter is of a blackish colour (which usually happens in the last period), it is conjectured to proceed from the spine: in this case, it is called the *mourning of the chine*.

Unless timely remedies be applied on its first appearance, the disorder becomes incurable. With a view, therefore, to prevent rather than to cure it, we shall briefly state the most likely methods of obviating the symptoms of this malady, on their first appearance.

If the lungs be the seat of the disease, as is the case when horses are first attacked with coughs, we cannot recommend a better treatment to be pursued than that pointed out, p. 82, in the article COUGH. But, if a swelling arise beneath the ears, jaws, or about the root of the tongue, proper and immediate applications should be made to procure a discharge and suppuration of the matter. When cough, difficulty of breathing, or a great degree of inflammation, accompanies such swelling, it will be adviseable to draw a little blood from a distant vein, in order to mitigate those symptoms: and, when the swellings about the parts have acquired an evident prominence, they should be fomented twice in twenty-four hours, for two or three days, with flannels dipped in the following decoction;—Let a handful of chamomile, and a similar quantity of wormwood, marsh-mallows, and elder-flowers, be boiled in three quarts of water, for fifteen minutes, at the end of which they are to be strained. The liquor is to be used hot; and the herbs applied warm to the parts affected, by way of poultice.

In the course of two or three days, it may be ascertained whether a suppuration will follow; in which case the tumors increase in size, and feel soft in the middle, when pressed by the hand. This is a favourable symptom; but if the swellings continue hard, without fluctuation, and are accompanied with a running from the nose, every precaution ought to be taken; as otherwise the disease may become troublesome. Hence, it will be necessary to prepare a vapour-bath, consisting of rosemary, lavender-flowers, and sweet marjoram, a handful of each boiled in two or three quarts of water. This is to be put into a pail, and the animal's head held over it twice a day, as near as can be borne, and for such length of time as the vapour passing up the nostrils is supposed to operate in the manner of an internal fomentation. During the whole treatment, the horse's head ought to be kept warm, as it will greatly contribute to the discharge of the noxious humours.

In case the running from the nose continue to increase, becoming progressively more discoloured, the above stated vapour-bath should be continued, and the eighth part of a pint of the following mixture injected into one or both of the nostrils, lukewarm, three or four times in the course of 24 hours: Take an ounce of linseed, half an ounce of chamomile-flowers, the same quantity of elder-flowers, and three pints of water. The whole is to be boiled for a few minutes and strained; but, previously to its application, it ought to be properly mixed with four ounces of *Mel Ægyptiacum*, the recipe of which was given in the article FRUSH.

Should the discharge, at length, become so malignant as to afford reason to apprehend a caries of the bones, the fumigation and injection must be continued, and two or three drams of the following mercurial ointment rubbed into the glandular tumors, every evening, for a fortnight; cutting away all superfluous hair, that the mercurial particles may be more effectually absorbed, and carried into circulation: Take one ounce of crude mercury, and half an ounce of Venice turpentine; let them be mixed together in a mortar, adding a few grains of sulphur, to facilitate the union of the ingredients; then gradually mix with them two ounces of melted and lukewarm hog's-lard, and cover the vessel closely; the unguent being now fit for use.—This is the last remedy that can be applied, with any prospect of success; and, if it unfortunately fail, the most rational farriers are of opinion, that the animal should be killed, without farther delay; as the skin will then be its only valuable part.

GLASS, a solid, transparent, brittle substance, produced by melting together sand, flint, alkaline salts, &c. besides which, there are various saline matters employed, namely, *Polverine*, or *rochetta*, which is prepared from Glasswort, or *Salsola Kali*, an indigenous plant; but which is chiefly imported from the Levant, where it is cut down in the summer, dried in the sun, and burned in heaps, when the ashes fall into a pit, where they concrete into a hard mass. A similar salt is obtained from the ashes *(kelp)* of the *Fucus vesiculosus*, or Common Sea-

Sea-wrack, or Sea-ware, a marine plant growing on the sea-coasts.—The sand used in the manufacture of glass is found at Lynn, in Norfolk, and Maidstone, in Kent.

These various articles are first carefully washed, and, after extracting all the impurities, they are conveyed to the furnace in pots made of tobacco-pipe clay, for the purpose of resisting the fire. Here the mixture is fused, and disposed of according to the different kinds of glass intended to be manufactured.

Round glass, such as phials, drinking-glasses, &c. are blown. When the different materials are sufficiently liquefied, the workmen dip long iron pipes into it, and blow the metal till it lengthens like a bladder. It is then rolled on a marble slab to polish it, when it is blown a second time, in order to form it into the shape of a globe. Next, it is cut off at the *collet*, or neck, adhering to the pipe: for this purpose, the latter is rested on an iron bar close to the neck, and a drop of water poured on it, by which means, it is cracked about a quarter of an inch, when it is slightly struck, or cut by a pair of shears, and immediately separated.—Now the workman dips the rod or pipe into the melting metal, whence he draws out as much as will connect the glass already made, to which he fixes the rod, opposite the opening caused by the breaking or cutting of the neck. In this position, the glass is carried to the mouth of the furnace, in order to be heated, or scalded: thus it becomes so soft, that it may be pierced, opened, and moulded at pleasure, without any apprehension of its breaking. The vessel, however, is not finished till it has again been returned to the mouth of the furnace, where, after being thoroughly heated, and turned quickly round, it will open to any size, by means of heat and circular motion. Should any impurities remain, they are cut off with the shears, as the glass continues flexible till it becomes cool. And, if the vessel thus made require a foot or handle, or any other ornament, the operator forms them separately, and unites them by the help of hot metal, drawn from the pots with the iron-rod:—the last operation for completing the glass, is that of ANNEALING.—See vol. i. p. 65.

Window or *Table-glass*, is worked nearly in the manner above described: the workman blows and manages the metal, so that it extends two or three feet in a cylindrical form. It is then carried to the fire, and the operation of blowing repeated till the metal is stretched to the dimensions required, the side to which the pipe is fixed diminishing gradually till it ends in a pyramidal form; but, in order to bring both ends nearly to the same diameter, while the glass continues flexible, a small portion of hot metal is added to the pipe; the whole is drawn out with a pair of iron pincers, and the same end is cut off with a little cold water as before.

The cylinder thus open at one end, is returned to the mouth of the furnace, where it is cut by the aid of cold water, after which it is gradually heated on an earthen table, in order to unfold its length, while the workman with an iron tool alternately raises and depresses the two halves of the cylinder: by this process, the latter accommodates itself to the same flat form in which it is again heated, cooled on a copper-table, hardened 24 hours in the annealing furnace, and afterwards preserved for use.

Window-glass is divided into various sorts, the principal of which are: 1. Crown-glass, which is the clearest and most expensive. The best window-glass is made of white sand, 60lbs.; purified pearl-ashes, 30lbs.; salt-petre, 15lbs.; borax, 1lb.; and of half a pound of arsenic. These materials are melted in the manner before mentioned, and if the glass should assume a dusky yellowish hue, a sufficient quantity of manganese must be added to remove that defect.

2. Newcastle-glass, which is most commonly used in England: it is of an ash-colour, and frequently speckled, streaked, and otherwise blemished. Its preparation consists of 60lbs. of white sand, 25lbs. of unpurified pearl-ashes, 10lbs. of common salt, 2lbs. of arsenic, and 2 oz. of manganese.

3. Phial-glass is an intermediate kind between flint and the common bottle or green-glass. The better sort is made of 120lbs. of white sand, 50lbs. of unpurified pearl-ashes, 10lbs. of common salt, 5lbs. of arsenic, and 5 oz. of manganese. The composition for green or common phial-glass consists of 120lbs. of the cheapest white sand; 80lbs. of wood-ashes well burnt and sifted, 20lbs. of pearl-ashes, 15lbs. of common salt, and 1lb. of arsenic.

4. The common bottle, or green glass, is prepared from any kind of sand fused with wood-ashes, to which may be added the clinkers of forges.

Plate-glass is the last and most valuable kind, and is thus called, from its being cast in plates or large sheets: it is almost exclusively employed for mirrors or looking glasses, and for the windows of carriages.—It is composed of 60lbs. of white sand cleansed; 25lbs. of purified pearl-ashes; 15lbs. of salt-petre, and 7lbs. of borax; and, if a yellow tinge should appear in the glass, a small quantity of manganese and arsenic are added, in equal proportions.

Plate-glass was formerly *blown*, but that method having been found very inconvenient, *casting* was invented; namely, the liquid metal is conveyed from the furnace to a large table, on which it is poured, and all excrescences, or bubbles, are immediately removed by a roller that is swiftly passed over it. It is then annealed in the manner already referred to.

The last process is that of *grinding*, which is performed by certain machinery, that is not generally known. In Britain, it is practised to the greatest perfection by Bohemians.

The *colouring of glass* with various shades, is an art known only to a few persons, and as it is not an object of domestic economy, we shall only notice a patent granted in February 1778, to Mr. JOHN KENT TARRANT, for his invention of painting, spangling, gilding, and silvering glass.—This is effected by applying the painting to the back of the glass, so that it may appear on the front, when finished: the colours are to be prepared with oil or varnish. Those parts which are intended to be gilt, must be previously traced on the glass, and when perfectly dry, the gold-leaf is to be applied: a similar method is to be followed for silvering. With respect to spangling, the patentee directs this process to be performed after the parts have been properly shadowed; and, as soon as the outlines are dry, the glass ought to be varnished with a solution of gum copal, and the spangles strewed on while it is wet; when they are perfectly dry, it is necessary to varnish them over two or three times.

Glass is so remarkably elastic, that if the force with which glass balls strike each other, be computed at 16, that with which they recede, from their elasticity, will be nearly 15. Hence we have seen *glass wigs*, and even *glass brushes*, manufactured by Bohemian artists.—If glass be exposed to the influence of dew, it becomes moist, which does not happen either with silver or any other metal. And if a goblet, or other drinking-glass, be filled with water, and rubbed on the brim with a wet finger, it will impart musical notes, higher or lower, in proportion as the glass contains more or less of that fluid: it likewise possesses considerable electrical properties, and is therefore frequently employed in experiments on electricity.

Before we conclude this article, we cannot omit to take notice of the numerous accidents that frequently happen in consequence of person inadvertently, or adventurously, swallowing fragments of broken glass. In such case, the safest remedy is to administer, as speedily as possible, large draughts of olive or other demulcent oils, by which the membranes of the stomach and intestines may be lubricated, and thus the injurious effects of the glass timely counteracted. If children, or other improvident persons, have cut themselves with glass, it is of the first importtance to ascertain whether any particles of it have remained in the wound: these should, at all hazards, be immediately extracted by a skilful operator; as, without such precaution, the most dangerous consequences are to be apprehended, in parts thus injured.

For different methods of uniting *broken glass*, we refer to the articles Cement, vol. i. p. 476; and Garlic, vol. ii. p. 366.

Glass-wort. See Salt-wort.

GLAUBER's-SALT, a chemical composition, which is usually prepared by adding to sea-salt an equal quantity of oil of vitriol diluted with water, distilling off the marine acid, and dissolving and crystallizing the remainder.

These salts may also be obtained by mixing four ounces of borax with one ounce and one dram of oil of vitriol; the whole of which, when sublimed, affords what is by chemists called *Sedative Salt*; and if the remainder be exposed to a strong fire, it will yield Glauber's-salts. They were first prepared by John Rhodolphus Glauber, a celebrated chemist of the 17th century; and are of considerable use in medicine as cooling purgatives, when taken in doses from six to twelve drams: they also prove excellent aperients in various chronical disorders, such as habitual costiveness, for which small doses of one dram of this salt, with two scruples of cream of tartar, and one scruple of sal-ammoniac dissolved in water, may be given with advantage, three or four times a day.

GLAZING signifies the coating or enamelling of earthen ware with any vitreous substance, the basis of which consists of lead. It is one of those familiar arts with which the ancients were doubtless better acquainted than our modern potters. The Roman urns discovered in Yorkshire, instead of being *glazed*, are covered on both sides with a fine varnish of a red coral tint, smooth, beautiful, and incomparably more durable than all our earthen vessels; having withstood the effects of time for a long series of centuries.

On the contrary, the glazing of all our earthen ware is very apt to crack, both from moisture and heat, being composed of *lead*, one of the most pernicious metals that could be devised for such important purpose. It is well known that lead is easily volatized by heat, and readily decomposed by any vegetable acid: hence it has been affirmed by various eminent writers, that we are under the necessity of inhaling or swallowing, perhaps every day, a minute portion of a metal which is one of the slowest, but most destructive poisons, and lays the foundation of many fatal disorders, such as palsy, dry colic, consumption, &c. the remote cause of which has not, till lately, been suspected.

Although we are no advocates for spreading alarm, or exciting apprehension, yet there appears to be sufficient reason to believe that our *glazed* culinary vessels are a latent source of disease; and when fruit or acids be allowed to remain in them for some time, the liquors or substances thus preserved will necessarily acquire a very dangerous impregnation from the metal.

Instead, therefore, of describing the composition and process by which earthen vessels are usually glazed, we shall earnestly recommend various substitutes for *lead* to the attention of the public.

M. Westrumb, an eminent German chemist, was required by the government of Hanover to devise a less pernicious method of glazing earthen ware than was hitherto practised. In consequence of numerous experiments, he has at length published the successful result of several compositions, in which not a particle of lead was employed, and which in his opinion will prove an useful glazing for ordinary vessels.

First: 32 parts of sand; 11, 15, or 20 parts of purified pot-ash; and from 3 to 5 parts of borax.

Second: 32 parts of glass (we suppose *flint-glass*); 16 parts of borax; and 3 parts of pure pot-ash.

Third: 150 parts of crystallized Glauber's-salt, with 8 parts of pulverized charcoal, previously roasted, till it has acquired a grey colour; 16 parts of sand; and 8 parts of borax.

Another method of *glazing without lead* has been invented by M. Nieseman, a potter at Leipzig: it consists of half a pound of salt-petre, half a pound of pot-ash, and one pound of common salt. This composition is not very expensive, and said to produce an enamel not inferior to that prepared with lead. Professor Leonhardi has investigated, and found it eminently useful. We trust, therefore, our potters will in future conscientiously desist from using that pernicious and slowly poisonous metal.

GLEANING, or Leasing, as it is called in some counties, is the gathering or picking up those ears of corn which are left after the field has been reaped, and the crop carried home.

This practice has lately been decided to be illegal; and so far as it respects those idle persons, whose sole occupation during the summer months, is to procure a scanty subsistence by *leasing*, the decision has been dictated by the soundest wisdom.

In some parts of the Continent, the farmers allow this privilege only upon condition that the *gleaners* contribute their labour for one or two hours towards the housing of the crop. Such regulation is occasionally beneficial to both parties, especially on the approach of rain; as the sheaves may thus be collected and loaded on carts, or otherwise secured by the aid of supernumerary hands, before the storm bursts forth, and perhaps damages the corn, by additional moisture.—In consideration of their services, these voluntary labourers are permitted to glean for one or two hours, more or less, according to the time they have assisted, before others are suffered to enter the field indiscriminately.

GLOVE, a covering for the hand and wrist, which forms a considerable article of commerce.

Gloves are divided into various kinds, such as silk, thread, cotton, leather, &c. The materials for the last-mentioned sort are the skins of kids, lambs, does, bucks, and other animals, the manufacturing of which affords employment to a great number of families.

Although the most fashionable gloves, and those very generally worn, consist of leather, yet they are by no means the most healthy. Indeed, it is equally improper and unwholesome to cover the hands and arms with any other than woollen texture, which ought to be preferred by all females who are anxious to improve the complexion of those extremities:—we are convinced, from experience, that no cosmetics are so efficacious and safe as simple animal wool.

GLOW-WORM, the FEMALE of the *Fire-fly*, or *Lampyris noctiluca*, L. is remarkable for the light it emits during the night. This luminous appearance depends upon a phosphorescent liquor found at the lower extremity of the insect, which, by unfolding or contracting itself, withdraws it at pleasure.

The glow-worm flies about chiefly in autumn, and frequents the grassy plantations of juniper-trees. The whole insect was formerly used in medicine as a solvent of the stone, and highly extolled as an anodyne; but it is at present deservedly exploded.

GLUE, a tenacious, viscid matter, serving as a cement to unite or connect substances together.

Glues are of different kinds, according to the various uses to which they are applied; such are common glue, glove-glue, and parchment-glue; but the two last are more properly called SIZE.

The common or string-glue, which is chiefly used by carpenters, joiners, &c. is prepared sometimes from the whole skins of oxen, cows, and other animals; but more generally from the parings or scraps, sinews of the legs, &c.

The parings are steeped for two or three days in water, when they are washed out, and boiled to the consistence of a jelly, which is passed, while hot, through osier baskets, in order to separate the impure particles. It is then left to subside and filtrate: when all feculent matters are settled at the bottom, the jelly is dissolved and boiled a second time; after which it is poured into flat vessels or moulds, whence it is taken out in solid masses, and cut into square pieces or cakes.—Lastly, it is suspended in a kind of coarse net fastened to a frame, or strings, where it is suffered to remain till completely dry.—The best glue for common purposes used in this country is generally imported from Ireland, and is exempt even from the convoy-duty; whereas the glue obtained from foreign markets pays to the customs 9s. 3d½. per cwt.

A very superior, but expensive, glue may be prepared from the hides of the oldest cattle, especially those of bulls. Its quality is likewise much improved by long keeping; and its strength may be easily determined, by immersing a piece in water for three or four days; at the expiration of which, if it swell considerably without dissolving, and resume its former dry state, on being exposed to the air, it may be considered as excellent.

Glue is also manufactured from the skins, fins, heads, tails, and cartilages of porpoises, cuttle-fish, and other sea-monsters. For this purpose, the parts above mentioned should be boiled in water, being carefully preserved from smoke, and whatever may discolour the liquor, or render it turbid. When all the substance of the fish has been boiled down, the jelly is strained through a sieve, and suffered to cool. It is then again boiled with the same precaution, till the drops, when dried in the open air, concrete on cooling. After having acquired a proper consistence, it is twisted in a manner similar to paste, and suspended on strings for drying in the shade. Glue, thus prepared, is more or less perfect, in proportion to the care with which it is clarified: it should be completely soluble in water.

Another very powerful glue may be prepared by a spirituous solution of isinglass, which Mr. Boyle directs to be first steeped for twenty-four hours in common brandy; when the isinglass is opened and softened, the whole should be gently boiled together, and stirred till it forms a perfect solution, and till a drop of the cold liquor indicates a strong jelly. It is then to be strained while hot, through a clean linen cloth, into a vessel, which ought to be closely stopped. A gentle heat will be sufficient to dissolve this glue into a colourless, and nearly transparent fluid, which is said to be so adhesive, that pieces of wood glued with it, separate elsewhere sooner than in the place where they are joined.—See Isinglass.

GNAT; or *Culex*, L. a genus of insects comprising several species, which are well known by the severe punctures they inflict.

Gnats deposit their eggs to the number of 200, by each female, on stagnant waters where they are hatched into small grubs, in the course of two or three days. On the sides are four small fins, by the aid of which the insect swims about, and swiftly dives to the bottom. The larvæ retain their form a fortnight, or three weeks; when they are converted into chrysalis, in which state they continue three or four days, floating on the surface of the water, till they assume the form of gnats.

These insects have a cylindrical body, consisting of eight rings. The sting, which is perceptible to the naked eye, contains five or six spiculæ, or darts, exquisitely minute. With these, gnats make punctures in the skin, and are supposed to inject a small portion of liquor which renders the blood circulating near the wound more fluid, and thus causes troublesome itching.

ing. Others observe, that female gnats only extract the blood by suction. As, however, these stings are generally attended with a painful swelling, different remedies have been suggested for its removal: one of the most effectual consists of small, but equal portions of Venice turpentine and sweet oil; they should be mixed and applied to the wounded part, which will be effectually relieved in the space of six hours. Indeed, olive oil alone, or unsalted butter, or fresh hog's-lard, if timely rubbed on the sting, will be equally efficacious. But we cannot approve of any *mercurial* solutions, that have occasionally been advised in popular books, for the more speedy cure of this trifling affection.

GOAT, or *Capra*, L. a genus of animals, comprising more than 30 species, only one of which is reared in this country, namely, the *Hircus*, or Common Goat, a native of Mount Caucasus, in Asia, whence it has been dispersed through Europe.

This species has arched and keeled horns, with a long beard, and is peculiarly attached to the company of man, even in its wild state. The females generally bring forth one or two, and very seldom three kids, after a gestation of about five months; they attain an age of twelve years.

Goats are sensible of caresses, and display a remarkable attachment to their friends. They are stronger, more nimble, and less timid than sheep; possess a lively, capricious and wandering disposition; and delight in elevated and solitary places, frequently sleeping on the points of rocks and precipices.—These animals are more easily supported than any others of the same size; for there are few herbs which they will not relish.—Nor are they liable to so many disorders as sheep; and, though able to support the vicissitudes of heat and cold more easily than the latter, yet they are very susceptible of severe frosts, which they endure with less difficulty in the society of other animals.

Goats emit, at all times, a strong and disagreeable odour, which however is not without its use: for, if one of these animals be kept in a stable, it is affirmed that it will be an effectual preventive of the *staggers*, a disorder which is often very fatal to horses. This influence of the goat is not, as Mr. Marshall judiciously observes, in his "*Rural Economy of Gloucestershire*," merely that of a charm; for the staggers are evidently a nervous disorder. Odours, in many cases, operate beneficially on the human nerves, and probably the strong scent of the goat has a similar effect on those of the horse; a conjecture which is partly corroborated by the practice adopted in Northumberland, where a few goats are generally mixed with the sheep, for the preservation of the health of the flock. It is also well known, that the former with safety eat plants, which would be destructive to sheep and other animals. Hence, goats devour the leaves of Hemlock with impunity; but the Spotted Snakeweed, *Polygonum Persicaria*, as well as the leaves and fruit of the Common Spindle-tree, *Evonymus Europaeus*, L. are to them not less fatal than to other quadrupeds.

Although the food of goats is attended with little expence, as they maintain themselves on the most barren mountains, yet their produce is of considerable value.

The whitest wigs are made of their hair, for which purpose that of the Welch he-goat is in the greatest request.—Their fat is in equal esteem with the hair, and candles are made of it, which, in whiteness and quality are said to be superior to those of wax; their horns afford excellent handles for knives and forks; and their skin is well calculated for gloves, especially that of the kid, which is dressed abroad, made into stockings, bed-ticks, bed-hangings, sheets, and even shirts.

The flesh of these animals, however, is hard, and almost indigestible: hence the meat of kids only should be eaten, as it is more tender, and affords good nourishment. Goat's-milk is sweet, nutritive, and medicinal; it is an excellent substitute for that of asses; and, when drunk warm in the morning and evening, with a teaspoonful of hartshorn, for several weeks, it has been productive of benefit to phthisical patients, who were not too much reduced.—Cheese prepared from goat's-milk is much valued in mountainous countries, after it has been kept to a proper age; but, possessing a peculiar flavour, it is to some persons very unpleasant; nor is it more easily digested than any other kind of caseous matter.

GOAT'S-BEARD, or *Tragopogon*, L. a genus of plants comprising 16 species, two of which are indigenous.

1. The *pratense*, Yellow Goat's-beard, or Go-to-bed-at-noon (because its blossoms close about the middle of the day) grows in meadows and pastures, where it flowers in June.—Dr. WITHERING remarks, that the young roots of this plant, in spring, may be boiled and eaten like asparagus, as they possess, a similar flavour, and are nearly as nutritious.

2. The *porrifolium*, or Purple Goat's-beard, is also found in meadows, and not unfrequently in upland pastures; it flowers in the month of May.—The succulent roots of this vegetable, when cultivated in gardens, are called *Salsafy*.—Cows, sheep, and horses, eat the whole of this plant; swine devour it with avidity, but it is not relished by goats.—The tender roots afford a delicious salad, and also an excellent substitute for asparagus.

GOLD, the most valuable of all metals, is of a bright yellow colour in its pure state, but acquires different shades, when alloyed with baser metals.

Europe is supplied with gold chiefly from Chili and Peru, in South America; though a small quantity is likewise imported from China, and the coast of Africa. This metal is also found in the sands of several large rivers which do not spring from mountains, but contain veins of gold: mines of it exist in various parts of Europe, and a very promising one has lately been discovered in the county of Wicklow, in Ireland.

Gold is obtained in a pure or native state more frequently than any other metal; it is in general mixed with a stony matter, from which it is extracted by amalgamation. It is more ductile than lead, or tin, but less elastic than either iron or copper. Gold becomes hard and brittle, by continued hammering, but resumes its ductility when slowly heated. Being the toughest, and at the same time the most malleable of all metals, one grain of it may be hammered into leaves that would cover a space of 1400 square inches.

This precious metal is the heaviest of all known bodies, excepting *platina*; its specific gravity being to that of distilled water as 19,2581 to 1,0000; that is, one solid inch of gold weighs about nineteen or twenty times heavier than one cubic inch of water. It melts in a low white heat, requiring, according to Mr. WEDGEWOOD'S calculation, 5237 degrees of FAHRENHEIT'S, or thirty-two of his own thermometer; a point much higher than that required for the melting of silver or copper.

Gold is not only the universal circulating medium for the purchase of commodities, but it is also applied to various purposes; for instance, chains, watches, plate, the making of gold lace for liveries, &c. As the manufacture last mentioned frequently becomes tarnished, and totally loses its lustre, we shall briefly observe, that this may be easily restored, by gently rubbing the lace with a sponge dipped in warm spirit of wine.

Gold is soluble in aqua-regia, by which considerable quantities of it are consumed by carvers and gilders, and also for the ornamenting of china, &c. It may, likewise, though imperfectly, be dissolved in the most concentrated aqua-fortis.

The relative value of gold to that of silver, was anciently as *twelve* to *one*. This proportion, however, varies according to the abundance or scarcity of the former metal. In our coinage, the value of fine gold is to that of fine silver, as $15\frac{1}{2}$ to 1. A similar proportion may be considered, upon an average, as the fixed standard of Europe.

There are various methods of determining the fineness of gold, or the proportion of alloy which it contains. For this purpose, *touch-needles* are generally employed, by which the respective quality of gold can be ascertained with tolerable exactness. These needles are small bars made of compound metals, in different proportions, which are accurately marked on each; and, by rubbing the metal under examination, and one or more of the needles, close to each other on a *touch-stone*, the different strokes are compared, in order to judge by the colour which bears the strongest resemblance to that of the doubtful metal. The most usual stones for this test are black basaltes, though either flint, or potter's ware of a black colour, may be employed with equal advantage. And though such a criterion cannot be relied upon with the same degree of accuracy as that of ascertaining the specific gravity of different metals, yet the touch-needles give a more exact information than might be expected from this superficial assay. Thus, an expert goldsmith will not altogether decide from the difference of colour, but will also be guided by the concomitant effect produced on the texture of the metal, when abraded by the touch-stone, namely, whether it be rough, dry, smooth, or greasy.—See GUINEA.

Several metallic compositions, however, yield marks or impressions on the touch-stone, very nearly resembling those of pure gold, and which can be distinguished or detected only by another more accurate test. In order to guard against such impositions, it is necessary to apply a drop of aqua-fortis to the suspected metallic strokes on the stone: if they do not disappear, in consequence of this application, it may be safely concluded that the gold is genuine; as, in the contrary case, it will be evident that it is a base or adulterated metal.

Gold-cup. See Bulbous Crow-foot.

GOLDEN-ROD, the Common or Wound-wort, *Solidago Virgaurea*, L. an indigenous perennial plant, growing in woods, hedges, heaths, and copses; and flowering from July to September.

This plant was formerly officinal, and is still in great repute among country people, for its medicinal virtues; but we are inclined to think, it may with greater advantage be employed as a dyeing drug. Both its leaves and flowers impart a beautiful yellow colour; which, according to Bechstein, is even superior to that obtained from woad.

GOLD-FINCH, or *Fringilla carduelis*, L. is a native of Europe, and is sometimes also found in Asia and Africa.

This bird is peculiarly beautiful in its colour, of an elegant form, and strikes melodious notes. Its bill is white, tipped with black, and its forehead and chin of a rich scarlet tint, divided by a line passing from each corner of the bill to the eyes, which are black.

Gold-finches begin to sing early in the spring, and continue to whistle the greater part of the year, when kept in a cage. In a state of confinement, they are much attached to their keepers, and will learn a variety of little tricks, such as to draw up small vessels containing hemp or Canary-seeds, and water; to fire squibs or crackers, &c.

Gold-finches construct very neat and compact nests with moss, dried grass, and roots, which they line with wool, hair, the down of thistles, and other soft substances. The females lay five white eggs, marked with deep purple spots at the larger end: they feed their young with caterpillars and insects; but the old birds subsist on various kinds of seeds, especially those of the thistle, of which they are extremely fond.

As these birds are frequently liable to be sick, it will be requisite to allow them every day a little groundsel, and some saffron in their water. If they are lax, a small portion of chalk should be given them, either by fixing it to the side of the cage, or crumbling it on the bottom.

Red sand, or gravel, should likewise be strewed every day in their habitation; for, as they chiefly subsist on oily seeds, the gravel or sand will qualify, and absorb the oil in their stomachs.—Gold-finches will breed with the Canary-bird: this intermixture is most successful between the male finch and the female Canary, whose offspring is productive, and is said to resemble the male in the bill, the colours of the head, and wings; and the hen, in the rest of the body.

GOLD-FISH, or *Cyprinus auratus*, L. is a native of the East Indies, whence it was introduced into England, about the latter end of the 17th century.

These fish are very tender, even in their native climates; but they are now become so naturalized, that they even breed in this country. They are chiefly kept in glass vessels for ornament; but it has lately been ascertained, that they thrive and propagate in ponds or other reservoirs; where they grow much larger and come to greater perfection than in the East:

hence it is proposed to rear them in preference to *carp*, on account of their possessing a finer flavour, and being much better calculated for the table than the common carp.

GOLDILOCKS. See CROW-FOOT.

GOLDINS. See Great White OX-EYE.

GOLD OF PLEASURE, or COMMON CAMLINE, *Alyssum sativum*, v. *Moenchia sativa*, L. an indigenous plant, growing in corn-fields, frequently among flax (with the seeds of which it is supposed to have been imported from foreign countries);—it flowers in June.

This plant is cultivated in Germany, on account of its *seeds*, from which an excellent *oil* is expressed: one bushel of the former yielding from 24 to 28lbs. of the latter, which is equally useful for culinary and other economical purposes.

According to German writers, the seeds of the Common Camline afford a larger proportion of lamp-oil, and which is of a finer quality than that obtained from rape-seed; though it is more liable to become rancid. Nevertheless, the culture of the former strongly recommends itself to the farmer; as it will grow in unfavourable weather, when flax cannot prosper. The Gold of Pleasure, however, requires a well prepared soil, should be thinly sown, and not harrowed in too deep: if properly cultivated, it yields more than one hundred-fold.

The seeds of Camline are likewise a favourite food with geese and other poultry.—Horses, cows, goats, and sheep, relish the plant.

GOOD BREEDING. See vol. i. p. 338.

GOOD-KING-HENRY. See Perennial GOOSE-FOOT.

GOODS. See LOADING.

GOOSE, or *Anas anser*, L. a well known species of birds, very common in this country: it is divided into two varieties:

1. The *ferus*, Grey Lag, or Wild Goose, that inhabits the fens, where each female hatches eight or nine young, which are frequently caught, easily tamed, and afford excellent meat, far superior to that of the domesticated kind. Towards winter, they collect in flocks, but reside the whole year in the marshes.

2. The *mansuetus*, or Tame Goose, or the Grey Lag in a state of domestication, from which it varies in colour, being more or less inclined to a grey. It is, however, often found perfectly white, especially the males or ganders.

The goose, in general, breeds only once in the course of a year; but, if well kept, it will frequently hatch twice within that period. Three of these birds are usually allotted to a gander; for, if that number were increased, the eggs would be rendered abortive: the quantity of eggs to each goose for sitting, is about twelve or thirteen.—While brooding, they ought to be fed with corn and water, which must be placed near them, so that they may eat at pleasure. The males should never be excluded from their company, because they are then instinctively anxious to watch over, and guard their own geese.

The nests, in which these birds sit, ought to be made of straw, and so confined that the eggs cannot roll out, as the geese turn them every day. When they are nearly hatched, it will be requisite to break slightly the shell near the beak of the young gosling, as well for the purpose of admitting air, as to enable it to make its way at the proper time.

Geese are very valuable, on account of the feathers they afford: for this purpose, they are unmercifully plucked in the county of Lincoln (where they are reared in the largest numbers) *five times* in the year: the first operation is performed at Lady-day, for feathers and quills, and is repeated four times between that period and Michaelmas, for feathers only. The old birds submit quietly, but the young ones frequently prove unruly and noisy. The latter may be plucked once, when about thirteen or fourteen weeks old, for feathers; but no quills must be taken from them; nor should this operation be performed at too early a season, because the goslings are liable to perish in cold summers.—Although the plucking of geese has by many been considered as a barbarous custom, yet experience has evinced, that these birds, when properly stripped of their feathers, thrive better, and are more healthy, than if they were permitted to drop them by moulting.

As geese form a principal delicacy at our tables, the most expeditious mode of fattening them is an object of some importance. Hence it has been recommended to keep them cooped up in a dark and narrow place, where they are to be fed with ground malt mixed with milk, or if milk be scarce, with barley-meal, mashed up with water. Another, and less expensive way, of which we can speak from experience, consists in giving them boiled oats with either ducks'-meat, or chopped carrots, alternately, as they are exceedingly fond of variety: thus, they will become very fat in a few weeks, while their meat acquires a fine flavour.

In order to fatten *Michaelmas*, or *stubble-geese*, it has been directed, first to turn them on the *wheat-eddishes*, or those pastures that grow after wheat has been harvested. Next, they are to be pent up, and fed with ground malt mixed with water, for which, boiled oats, malt, or wheat, may occasionally be substituted.

This method of fattening, however, by no means deserves to be countenanced; for, as the flesh of geese is naturally a precarious food, confinement, without exercise, renders it still more unwholesome. Their fat, indeed, is almost indigestible; and their flesh has a very bad effect on wounds and ulcers. It is also pernicious to persons, whose habits of body predispose them to inflammatory diseases, and frequent eruptions of the skin; for the prevention of which, they ought prudently to abstain from this delicious morsel.

GOOSEBERRY, the ROUGH, or FEA-BERRY, *Ribes grossularia*, L. an indigenous shrub growing in woods and hedges, especially about Darlington, Durham; also, on old buildings and church-towers, whither it has probably been transplanted by birds. This useful bush flowers in April, and bears fruit in June or July, which, however, does not acquire its natural vinous flavour in this climate, till August or September.

Although gooseberries are generally eaten, or employed for culinary purposes, before they arrive at perfect maturity, yet being one of the most saccharine productions we possess, they might with more advantage be converted into *wine*. As each pound of the juice expressed from ripe berries requires only one ounce of soft sugar (whereas the ripest currants require double that quantity) to induce the vinous fermentation, a very excellent and wholesome domestic wine may be made at a trifling expence. After standing several years in bottles well corked, it becomes equal in quality to muscadel, or other sweet Italian wines. If the flower-buds of this shrub be added to a cask of any other flavourless wine, Bryant asserts (in his 1st volume of "*Nutritive Plants*," p. 245, German edition) that they impart to it the taste of genuine muscadine.

Wild gooseberries, however, are of a very inferior size to those cultivated in a rich garden soil, especially when improved by inoculation, or engrafting; in which state they frequently attain an uncommon size.

There is another species of this shrub growing wild about woods and hedges, in several places in Cambridgeshire, Oxfordshire, Norfolk, and the Isle of Wight. We allude to the Smooth Gooseberry, or *Ribes uva-crispa*, L. which can with difficulty be distinguished from the preceding species, either by the flower scales, or even by the smoothness of its berries. Mr. Robson assured Dr. Withering, that the seeds from the same plant will produce both rough and smooth gooseberries. The last-mentioned species, however, flowers somewhat later, thrives in almost every soil, and does not attain the size of the rough gooseberry: its yellow berries are transparent, juicy, and contain a great number of seeds.

Beside these, we met with another Linnæan species, or perhaps a variety of the former, called the Red Gooseberry, or *Ribes reclinatum*, which grows wild in Germany, &c. has somewhat broader leaves than those before described, and produces a red or dark-purple fruit of a very sweet flavour. It thrives remarkably in a fat, light, and sandy clay: we therefore conclude that its berry would be eminently adapted to the preparation of domestic wines.

All the different gooseberries are wholesome fruit, but should not be eaten before they are perfectly ripe; nor is it proper to swallow their stones along with the juice; but the skin may, with probable advantage, be used by those who are accustomed to take large quantities at one time; in order to prevent flatulency. It is, however, founded on erroneous notions of their chemical properties, either to boil the *unripe* berries for sauces, or to convert them into domestic wines, which, though more cooling and refreshing, do not possess the delicate flavour, and rich saccharine quality, inherent only in ripe fruit.

Gooseberry Caterpillar. See vol. i. p. 456.

Goose-Corn. See Moss-rush.

GOOSE-FOOT, or *Chenopodium*, L. a genus of plants, comprising twenty-seven species, eleven of which are indigenous; of these the following are the principal:

1. The *Bonus Henricus*, Perennial Goose-foot, Mercury Goose-foot, or Good King Henry, which grows amongst rubbish, on road sides, and walls; and is sometimes found in pastures: it produces purplish-green flowers, that are in bloom from May to August. This plant is cultivated like spinach by the poorer class of people in Lincolnshire: its leaves are frequently boiled in broth; and the young shoots, when peeled and dressed,

are, on account of their flavour, eaten as substitutes for asparagus.—Neither goats nor sheep relish this plant, which is also refused by cows, horses, and hogs. Its roots, however, are frequently given to sheep affected with a cough, and are supposed to afford an excellent medicine for preventing consumption in those animals.

2. The *album*, White Goose-foot, or Common Wild Orache, which grows frequently in corn-fields, on old dunghills, rubbish, and in gardens; and flowers in the months of July and August.—It is eaten by cows, goats, sheep, horses, and hogs, which last devour it with avidity; but LINNÆUS asserts that it is totally refused by horses.—According to Prof. PALLAS, the white goose-foot is a very troublesome weed among corn, on the banks of the Volga, where the German colonists make use of its very abundant seed, by mixing it with bread-corn, and also boiling it separately in the form of *groats*.—TOWNSEND relates, that a species of pot-ash, or barilla, is prepared from this plant.

3. The *olidum*, *v. vulvaria*, Stinking Goose-foot, or Fetid Orache, an annual plant, growing on road sides, old walls, and rubbish, and flowering in August.—This species, in a fresh state, has a nauseous taste, and a strong offensive smell, similar to that of putrid salt fish. It is nevertheless eaten by cows, horses, goats, and sheep, but refused by swine.—Though exploded by the London College, Dr. CULLEN strongly recommends the fetid orache as a powerful antispasmodic, especially in hysterical cases.—DAMBOURNEY dyed wool of a durable citron colour with a decoction of the whole plant; but the stuff was previously immersed in a diluted solution of tin; and though the liquor emitted the unpleasant fetor of this vegetable, yet the wool acquired no smell.

4. The *maritimum*, Sea Goose-foot, Small Glass-wort, or Sea-blite, which abounds on the sea-shore, and flowers in the months of July and August.—Dr. WITHERING mentions it as an excellent pot-herb.—In Siberia, and in Astrakhan, the inhabitants obtain from this plant their *pot-ash*, which probably partakes more of the nature of *soda*.

5. The *polyspermum*, Upright Blite, Round-leaved Goose-foot, or All-seed Goose-foot, which grows on cultivated ground and dunghills, and flowers in the month of July or August.—This curious plant has not hitherto been converted to any useful purpose; though we believe its numerous seeds might be advantageously employed in feeding poultry. Perhaps it is a variety of the *quinoa*, which grows in the mountains of Peru, where each plant affords upwards of 1000 grains, equal, if not superior, to rice; for we find in the French "*Année Litteraire*" for 1781, that this exotic vegetable is a species of the goose-foot.

GOOSE-GRASS, or CLEAVERS, CLIVERS, or CATCHWEED GOOSE-GRASS; *Galium aparine*, L. an indigenous plant, growing in cultivated grounds and hedges, and flowering from June to September.

This succulent vegetable possesses no smell, and is of a somewhat bitter and acrid taste. An ointment prepared of the herb, when bruised and mixed with lard, is said to be an useful application for discussing strumous swellings.

Dr. MAYERNE informs us, that

three ounces of the juice of this plant, taken twice a day in wine, have been found singularly beneficial as an aperient and diuretic in incipient dropsies. Its greatest efficacy, however, is said to be evident in scorbutic complaints, for the cure of which a tea-cupful of its expressed juice is to be taken every morning, for nine or ten days. When the fresh plant cannot be procured, the dried leaves may be infused and drunk like tea.

The branches of this vegetable are employed by the Swedes, as substitutes for a hair-sieve to strain milk. Young geese are exceedingly fond of the leaves; and the whole plant is eaten by horses, cows, sheep and goats.—It is remarkable, that the bones of poultry feeding on the roots of goose-grass, acquire a red colour.

There is another species of this plant, namely, the Cross-leaved, Goose-grass, Bed-straw, or Cross-wort Madder, *Galium boreale*, L. which grows on mountains, rocks, and in gravelly places in Westmoreland and Wales; its stalk attains a height of from one to four feet, and its beautiful white flowers appear in July and August. —In Sweden, the root of this vegetable is known by the name of *mattara*, and is generally employed for dyeing wool of a fine crimson colour.—According to Bechstein, this herb affords a very grateful and wholesome food to cattle.

Gorze. See Furze.

GOURD, or *Cucurbita*, L. a genus of exotic plants comprising nine species, of which the following are the principal:

1. The *lagenaria*, or Bottle Gourd, a native of both Indies, where it grows on the banks of rivers: it has thick, trailing, downy stalks, extending from 10 to 20 feet, and producing large white flowers, which are succeeded by long incurvated fruit of a whitish yellow colour, from 2 to 5 or 6 feet in length, and from 9 to 24 inches in circumference.

2. The *Pepo*, Pompion, or Common Gourd, which is cultivated in various parts of Germany, but the native soil of which is unknown.—It produces fruit of various shapes and sizes, frequently 18 inches in diameter, and its culture in a tolerable land exposed to the rays of the sun, requires but little trouble. The pulp of the fruit is eaten as an ingredient in puddings and pancakes. But the most economical use of this bulky vegetable production, is that of fattening pigs, as well as carp when thrown into fish-ponds. For these purposes, extensive fields are devoted to the growth of the Common Gourd in Bohemia, Saxony, Thuringia, &c. climates which coincide with many parts of Britain, so that this plant certainly deserves to be more generally reared in this country.—Besides, its numerous seeds afford an unusual proportion of expressed oil, amounting to one half of their own weight: when triturated with water, they yield a cooling and nutritive milk; and boiled into a jelly, they are said by Bechstein to be a very efficacious remedy for curing a retention of urine.

3. The *verrucosa*, or Warted Gourd, which is reared in America as a culinary vegetable: its young fruit is eaten boiled, and frequently mixed with wheaten flower in the baking of bread, to which it imparts a yellow colour, but an agreeable taste.

4. The *Melopepo*, Erect Gourd,

or Squash. It has a long erect stalk, several feet in height, which becomes bushy towards the top. It produces a knotty fruit, of a moderate size, and is used like the preceding species.

5. The *lignosa*, Ligneous-shelled Gourd, or Calabash, which has long trailing stalks, extending along the ground in every direction. Its smooth roundish fruit is provided with hard woody shells.

All these species of the Gourd have several varieties, and the fruit of each frequently changes it form. They are raised from seed, set annually in the month of April, or in the beginning of May. But, if the plants be forwarded in a hot-bed till they are a month old, they will produce fruit six weeks earlier, and mature comparatively sooner. The first species, or Bottle Gourd, however, seldom ripens in Britain without the aid of artificial heat. Hence these plants are in our climate cultivated chiefly for curiosity, but in the East and West Indies, Bottle-Gourds are sold in the markets, and constitute, during the summer months, the principal food of the common people, who boil and season them with vinegar; and, sometimes filling the shell with rice and meat, prepare a kind of pudding. These shells are employed as flasks for holding water, and likewise converted into spoons, funnels, and even hats.—Lastly, it is remarkable, that the stalks of the different species of the gourd contain a considerable proportion of nitrous particles, and might therefore become useful in the manufacture of saltpetre.

GOUT, or Podagra, a disease of the Proteus-kind, thus defined by Dr. Cullen: It is hereditary, and commences without any apparent external cause, but is in most instances preceded by indigestion, or other affection of the stomach; its paroxysms are ushered in with fever, pain at the joint, generally, of the great toe, always attacking the joints, and chiefly those of the feet or hands: it returns at intervals, often alternates with indispositions of the stomach, or other internal parts.

Forerunners of the Gout:—Indigestion often returning; thick sediment in the urine, sometimes for a whole year previously to the paroxysm, while that fluid emits the flavour of milk; vomiting, hiccough, and frequent pains of the forehead.

Peculiarities of the disease:—Chalky excrescences appear on the joints, which shortly before death also cover the face; the gout infects dogs licking the sore or tumefied parts of their master, and, according to some authors, it may likewise be communicated by clothes: it occurs most frequently in the spring; is often connected with the stone or gravel; and has sometimes been confounded with acute rheumatism.

Causes:—Acid food, especially sour cherries; the immoderate use of fish, sugar, wine, cyder, and spirituous liquors; in short, luxury and debauch of every kind; suppressions of diarrhœas, dysenteries, or the hemorrhoidal flux; repulsion of the itch, scurvy, or other cutaneous eruptions; sleeping on fresh hay, &c.

Prevention and Cure.—Although this obstinate disease has generally been considered as incurable, and thus become too often the boon of the most ignorant pretenders, yet we believe that the want of success in the profession, must be ascribed partly to that fashionable superficial treatment which constantly aims at alleviating urgent symptoms, and partly to the difficulty of prevailing on those whimsical patients to pursue a steady and regular course of both medicine and diet, without which no radical cure of the gout can reasonably be expected.

During a paroxysm of the gout, the patient ought to be treated according to the state of his *fever* (which see); and, as the crisis of the disease generally takes place in three or four weeks, either by transpiration of the pores, or the discharge of urine, those secretions should be promoted by the mildest sudorifics and diuretics. Hence diluent drinks, such as barley-water in which sal ammoniac has been dissolved, in the proportion of one dram to each pint, should be liberally drunk; but, where impurities in the first passages are suspected, gentle emetics may be administered; and if fulness of blood prevail in the vessels, venesection will perhaps be advisable.—MARINO, an Italian physician, prescribed for his gouty patients half a pound of olive oil to be swallowed several times a day, with uncommon success: but we apprehend, that few persons will be inclined, or able, to take such profuse draughts. Meanwhile, the parts affected should be carefully covered with flannel; and though we do not approve of anodynes to be taken internally, because the crisis of this malady cannot be accomplished by Nature without painful efforts, yet the following applications have occasionally been found of great service, in abating the most excruciating pain, viz. oil of wormwood; or Peruvian balsam dissolved in alcohol; or a solution of sal ammoniac, in white wine; or a cataplasm made of elder flowers, boiled in cream, and applied as hot as the patient can bear it; or oil of wax dropped on the part affected; or the skin of an eel; or liniments consisting of vinegar and soap; or the leaves of the Rough Bindweed; or even fresh horse dung, &c. all have, in particular cases, been employed, and found productive of good effects. Nevertheless, we by no means recommend these remedies to be indiscriminately or promiscuously used, as the propriety and safety of their application should be determined by professional advice.

When the gout retreats to more dangerous, internal parts, such as the breast and stomach, it is generally attended with vomiting, which ought to be supported by small doses of ipecacuanha, about half a grain every ten minutes, while the parts affected are rubbed with vitriolic æther. As soon as the stomach is composed, small doses of camphor, or vitriolic æther, internally, will be of essential service to allay the spasmodic action of the viscera. At the same time, sinapisms should be applied to the soles of the feet, and the lower extremities kept warm; a treatment by which the pain, as well as the seat of the disease, easily returns to its former place.

Various expedients and plans of regimen have been devised, in order to prevent, or retard, the fits of the gout. As we cannot enter into the peculiarities of different constitutions, we shall here briefly point out that mode of living which will, in general, be found the most conducive to the purpose.—Temperance, in the strictest sense, total abstinence from acid, fermented and spirituous liquors, and a very moderate use of wine, are the principal circumstances to be attended to by the gouty; but, in their food also, they should be extremely careful, and avoid all fat, rancid, salted, or smoked provisions of every description, especially *game* and *fish*. Spices, pickles, and stimulating dishes, in general, are the most powerful promoters of this painful disease; while hot suppers, late hours, and long sleeping in feather-beds, are its greatest nursery. Hence, persons liable to attacks of the gout, ought attentively to observe whatever agrees or disagrees with their digestive organs; for, as long as their stomach duly performs its office, there is reason to hope for a favourable change. Moderate exercise should likewise, on no account, be neglected; because excessive fatigue and long-continued application to intense study, are equally detrimental. Fear, violent grief, and an irascible temper, ought to be vigilantly controlled by the calm reflections of reason.—Beside all these precautions, however, it will be useful to adopt some particular rules of diet and regimen, in order to counteract the constitutional predisposition to that formidable disease. With this intention, we from experience recommend the constant use of *barley-bread*, and to bilious individuals, *mare's milk*, or the whey obtained from it after coagulation. Large doses of ginger, from one to four or six drams pulverized, and boiled in cow's milk for breakfast, have lately been found an excellent preventive. Absorbent powders, consisting of two scruples of calcined magnesia, with purified kali and powdered rhubarb, from three to five grains of each, have likewise been taken with considerable advantage during the intervals of gouty fits; but this medicine ought to be repeated for several weeks, or even months, at least every other morning, according to the nature of the case.

Lastly, there is sufficient reason to conclude, that the internal use of the *marine acid*, or spirit of salt diluted with water, if continued for a proper length of time, and aided by bathing the legs daily in water saturated with a small proportion of the same acid, would greatly tend to prevent the return of the disease. Indeed, Dr. WOLLASTON has discovered, that gouty matter consists of a peculiar *(lithic)* acid which is supposed to be generated in the human body, and combined with the *mineral* alkali: consequently, as the marine acid has a greater attraction for this alkali than the lithic acid (or that which contributes to the formation of the stone in the bladder), it appears to be a reasonable inference, that the generation of chalky matter may be counteracted by the copious use of that acid, both internally and externally, which would preferably combine with the mineral alkali, and thus deprive the lithic acid of its nucleus or basis.

GOUTWEED, HERB-GERARD, ASH-WEED, or GROUND-ASH, *Ægopodium Podagraria*, L. an indigenous perennial plant, growing in orchards, gardens, pastures and hedges, and flowering in the months of May and June. This plant has received its name from its supposed efficacy in relieving the gout. Its leaves are very tender, and may be eaten early in the spring among other pot-herbs; being possessed of nutritive rather than medicinal properties.—Cows, sheep, and goats, are remarkably fond of the goutweed, but it is refused by horses.

Grafting. See Engrafting.

GRAIN, strictly speaking, signifies the fruit or seed, growing in a spike or ear; in which sense it comprehends corn of every kind, such as Wheat, Rye, Barley, Oats, &c. Of the preparation, culture, and preservation of these, we treat in their alphabetical series.

Grain, also denotes the smallest weight used in England, and which is thus denominated, because it is regulated by the weight of a grain of wheat, selected from the middle of the ear, and well dried. The grain is employed for troy-weight, in the weighing of gold, silver, jewels, bread, and liquors.

The grain employed by apothecaries, is the same as that of goldsmiths (see Avoirdupois), though they afterwards vary with respect to the computation of greater weights arising from the aggregate of grains. Thus, with the former, 20 grains make a scruple, 3 scruples a dram, 8 drams an ounce, and 12 ounces a pound.

Grain, is likewise applied to the figures, or representations of grains on stones, stuffs, leather, &c. Thus we say, in some marbles the *grain* is very fine, in others it is much coarser; Morocco has a richer, that is, a larger grain than shagreen, &c.

GRAINS, are the refuse of malt, which has been brewed or distilled. Immense quantities of this article are consumed in London and its environs for the feeding of pigs, 100,000 of which were annually fattened, a few years since, by one extensive distiller.—Cow-keepers in the vicinity of the metropolis likewise feed their cows frequently with grains, which produce indeed abundant milk, but of a very inferior quality. Hence we are of opinion that such refuse, especially that from brew-houses, might with greater advantage be employed in the process of making vinegar; for, by bruising the grains so as to reduce them to a pulp, adding the necessary quantity of tepid water, together with leven, yeast, or other fermentable substances, they might easily be converted into a strong acid.

GRANARY, a building in which corn is deposited, especially when designed to be kept for a considerable time.

In constructing granaries, the principal objects are, strength or solidity of the edifice, and its exposure to the most drying winds.—In the county of Kent, previously to removing the corn to such a magazine, it is tossed with a shovel from one end of a large room to the other; by which means the lighter substances fall into the middle, while the ripe grain only is collected at the sides or extremities of the room. The corn is then *screened*, and conveyed to the granaries, where it is spread to the depth of half a foot on the floor, and turned twice in the week: the operation of screening is repeated once a week. At the expiration of two months, the corn is heaped up to the thickness of a foot, for a similar period, during which it is turned once, or, if the weather be damp, twice in the week, and is also occasionally screened. At the end of five or six months, the heaps are enlarged to the height of 2 feet, and turned once or twice in a month, the operation of screening being likewise from time to time continued.

When grain has thus lain for

one year, the quantity is increased to the thickness of 2½ or 3 feet; it is turned once in the course of three weeks, or a month, and screened accordingly. At the expiration of two or three years, it is moved only once in two months, and screened every quarter; but, in proportion to the length of time it is kept, the turning, &c. should be more frequently repeated, in consequence of which the grain will be much improved. In storing corn, it is requisite to leave an area of a yard in width on every side of each heap, into which the corn should be tossed as often as appears necessary. In the Kentish granaries, two square holes are made at each end of the floor, and a circular one in the middle of the building, through which the corn is shifted from the upper rooms into those below, and again from the lower rooms into the upper ones, in order that it may be the more effectually turned and aired. The screens or frames employed for sifting the corn, are made with two partitions, for the purpose of separating the pure grain from the dust, which falls into a bag. By these precautions, corn has often been preserved sound and pure for thirty years; and it is a circumstance worthy of notice that, though by long keeping the grain decreases in bulk, yet it will yield proportionably more flour, and the bread will likewise be whiter and more wholesome; as the superfluous moisture only evaporates during the frequent airing.

M. Du Hamel, and Dr. Hales, have recommended various contrivances for ventilating, or introducing fresh air through corn deposited in granaries, with a view to preserve it sweet and dry, as well as to secure it from weevils or other insects. This object is to be effected, by constructing granaries with lattice-work, and hair-cloth at the bottom. The ventilators for supplying fresh air may be affixed to the wall, either within or on the outside of the granary, beneath the floor, or in the ceiling; but, in the former case, it will be necessary to place the handle of the lever externally, as otherwise the person working the machinery would be exposed to suffocation, when the corn is fumigated with sulphur for the expulsion of weevils. Small movable ventilators may be constructed on this plan, for ventilating corn in large bins deposited in granaries. Similar contrivances may be applied to the lowest floors of small magazines, so as to be worked by men standing on the ground, either within or without the buildings.

In the 8th vol. of the "*Letters and Papers of the Bath and West of England Society*," &c. Thomas South, Esq. gives a description of a cheap and efficacious ventilator, for preserving corn on ship-board. This machine consists of a forcing pump, with perforated tubes annexed to it; and by means of which fresh air may be communicated to every part of the cargo. — Mr. South's air-vessel is, for the sake of cheapness, confined to a diameter of 10 inches; but he observes that, if the latter be enlarged to 14 inches, the effect of the machine will be nearly doubled; and if the length of the trough (by the suction - valve) be extended 10 inches, a power will be obtained capable of ventilating a cargo of 400 tons in the course of one hour. The price of a ventilator on the smaller plan, is computed by Mr.

SOUTH, at about five or six guineas: one on a larger scale might perhaps amount to twenty guineas; a sum which, in either case, enhances the price of corn only at a rate of less than four-pence per quarter, on the first cargo. These machines, if well painted and properly preserved, will continue useful for many years.—A more minute account of Mr. SOUTH's invention is contained in the volume of the "*Letters*," &c. before quoted, where its various parts are specified and illustrated by an engraving.

To preserve corn in barns or granaries, Dr. DARWIN observes, it is requisite first to make them dry, and, secondly, to keep them in that state; because no seeds will vegetate without moisture. In order to dry seeds, the heaps should be frequently turned over in warm dry weather: hence, in this climate, the doors and windows of granaries should open towards the south, for the reception of the warmth of the sun, with air-holes round the building, for sufficient ventilation; and which apertures ought to be sheltered from rain or snow, by boards placed for that purpose on the outside.—Heaps of corn should be surrounded with planks, in order to prevent them from touching either brick or stone walls; because, when cold north-east winds are succeeded by moist and warm south-west winds, such walls frequently precipitate the moisture from the atmosphere, and communicate it to those bodies which are in contact with them.—According to Mr. TULL, the safest method of preserving a large quantity of wheat is, to dry it gradually in a malt-kiln on a hair-cloth, with no other fuel than clean straw, and with a heat scarcely exceeding that produced by the rays of the sun.—In this temperature, the grain is to remain from 4 to 12 hours, in proportion to its previous dampness. The vegetative principle of the corn is not destroyed by this process; as instances have occurred of its growing when sown, after it had been thus kept for seven years.

With respect to the best method of securing grain from insects, &c. we refer the reader to the article CORN, pp. 68, 69.

GRANATE, or GARNET, a genus of fossils, classed among siliceous earths, and containing three species, the principal of which is the crystallized granate. It is ranked among precious stones, but is one of the least valuable, as it varies in its colour, and the form of its crystal, more than any other; being sometimes of a deep red, sometimes yellowish or purplish, and, at others, of a brown or black tint. It is inferior both in lustre and hardness to all other gems, and yields to the file, though it will strike fire against steel.

Granates are either *oriental* or *occidental*: the former are brought from the East Indies, and the latter from Spain, Bohemia, and Silesia. They are found of various sizes, from that of a large pin's head, to one inch in diameter, but seldom exceed one-fifth of an inch.

GRANITE, in Natural History, a genus of stones, consisting chiefly of quartz, feldspath, and mica; forming rough and very large masses of great hardness, yielding fire with steel, not fermenting with acids, and slowly but imperfectly calcinable in a great heat.—The most stupendous ridges or chains of mountains on our globe, are composed of this fossil, which presents three distinct species.

1. The hard white granite, with black spots, commonly called *moorstone*. It is much used in London, for the steps of public buildings, and on other occasions where great strength and solidity are required.

2. The hard red granite, variegated with black and white, which is common in Egypt and Arabia.

3. The pale whitish granite, diversified with black and yellow. This is sometimes found in strata, but more frequently in loose nodules, and is employed for the paving of streets.

Granites take a good polish; hence the Egyptians formerly employed them, and the Italians still use them for working large pieces of ornamental architecture; a purpose to which this fossil is uncommonly well adapted, as it is not liable to decay in the air. Indeed, there are columns, statues, and other monuments of antiquity erected of granite, and preserved to this day entire, though some of these relics have withstood the test of time for upwards of 4000 years!

GRANULATION, a chemical process, by which metallic substances are reduced to small grains. It consists simply in pouring the melted metal into cold water, from a considerable height. Lead or tin may be granulated, by pouring them when melted into a box, the inner surface of which is to be rubbed with chalk, and the box shaken till the metal becomes cold. The design of granulation is chiefly to facilitate the combination of metals with other substances; because, from their great ductility, they are incapable of being pulverized, and liable to contract impurities from the tedious operation of filing.—See also LEAD and SHOT.

GRANULATION is also applied to wheat when divested of its husk, and other surrounding parts, so that the heart or middle of each grain only is preserved entire. In this state, it is called *Semolina*, and often sold by grocers: it affords an excellent and nutritive food, especially for children and invalids.

GRAPES are the fruit of the VINE, on the culture of which we shall treat under that head.

Grapes are excellent fruit, and well calculated for cleansing the humours, on account of their laxative properties, by promoting the natural evacuations, without debilitating the body. They are, however, remarkably flatulent, and ought to be avoided by those who are liable to eructations, and other complaints arising from bad digestion.—It is asserted, that the small stones of grapes, when swallowed together with the juice in large quantities, have occasioned the most painful and inveterate colics.

Sour grapes ought never to be eaten, as they easily produce gripes, and even the dysentery.

GRASS, in botany, is defined to be a plant or vegetable which has simple leaves, a jointed tubular stem, a husky calyx called *gluma*, and the seed of which is single.

Grasses are divided into two classes, leguminous and culmiferous. To the former belong wheat, barley, oats, and all other grain, for the various modes of cultivating which, the reader will consult the articles in their alphabetical series.

Culmiferous grasses may likewise be subdivided into two classes, for agricultural purposes; hence it is of importance that every farmer should distinguish, 1. Those which run to seed-stalks in a manner similar to the common annual species of corn, and the leaves of which gradually decay, in proportion as they approach towards perfection, and totally wither when the seeds are fully ripe. In this division may be ranked Ray or Rye-grass, to which may be added the Sweet-scented Spring Grass, the Dog's-tail-grass, and the Bent-grass. 2. Those, the leaves of which grow after the seed-stalks are formed, and retain their succulence and verdure during the whole season. Such are the Fescue and Meadow Grasses, that continue green and succulent, even after the seeds have attained to maturity, and while the flower-stalks are fading.

We cannot here specify the places of growth, proper soils, or the modes of cultivating the different grasses; but, as many farmers are not sufficiently acquainted with the peculiar names of those plants, and as little improvement can be made in this important branch of husbandry without such knowledge, we shall here state the proper appellations of the best *cultivated* and *uncultivated* grasses, referring the reader to the various articles as they occur in their alphabetical order.

I. CULTIVATED GRASSES.

1. Red Darnel, or Ray-grass: *Lolium perenne*, L.
2. Crested Dog's-tail-grass: *Cynosurus cristatus*, L.
3. Meadow Fescue-grass: *Festuca pratensis*, L.
4. Meadow Fox-tail-grass: *Alopecurus pratensis*, L.
5. Smooth-stalked Meadow-grass: *Poa pratensis*, L.
6. Roughish Meadow-grass: *Poa Trivialis*, L.
7. Soft Brome Grass, Lob-grass, or Oat-grass: *Bromus mollis*, L.
8. Meadow Soft-grass: *Holcus lanatus*, L.
9. Sweet-scented Spring-grass: *Anthoxanthum odoratum*, L.
10. Timothy-grass: *Phleum pratense*, L.

II. WILD, OR UNCULTIVATED GRASSES.

1. Sheep's Fescue-grass: *Festuca ovina*, L.
2. Hard Fescue-grass: *Festuca duriuscula*, L.
3. Water Hair-grass: *Aira aquatica*, L.
4. Annual Meadow-grass: *Poa annua*, L.
5. Flote Fescue-grass: *Festuca fluitans*, L.
6. Reed Meadow-grass: *Poa aquatica*, L.
7. Mountain Melic-grass: *Melica nutans*, L.
8. Creeping Bent-grass: *Agrostis stolonifera*, L.
9. Marsh Arrow-grass: *Triglochin palustre*, L. and,
10. Sea Arrow-grass: *Triglochin maritimum*, L. which is peculiarly calculated for sheep-walks.

These are the principal grasses, cultivated and wild, which merit the attention of agriculturists; but, as their seeds as well as those of other grasses drop from the husks a very short time after, and many of them, before they are ripe, those who wish to preserve such seeds, ought to watch them diligently; as the neglect of a very few days will deprive the cultivator of an opportunity of collecting them. The Tall Fescue-grass, however, forms an exception: for, as its seeds are not fertile, it can only be propagated by parting and planting the roots.

The culture of grasses has been particularly attended to within these few years; and, as they support many of the most useful quadrupeds, the art of increasing the quantity of leaves round the roots of grasses, is deservedly regarded as an object of great importance. It simply consists in eating off the central stems by sheep, horses, or other cattle, early in the season: hence Dr. DARWIN justly observes, that new leaves are produced around the first joint of the stem thus grazed. This practice is especially useful in low meadows, and affords a double profit, if continued till the month of May; as, in moist situations, a crop of hay is certain to succeed, which, by this method, will not only be much finer, and more copious, but the expence that must otherwise have been incurred in providing hay, may in a great measure be saved by making use of such early grass.

Those of our readers who wish to acquire more minute information respecting the various native grasses, we refer to Mr. SWAYNE's excellent Treatise, entitled "*Specimens of Pasture Grasses*;" (folio, 1l. 1s.), a work replete with information.

GRASS PLOTS and WALKS, are chiefly formed by covering spots of ground with turf taken from a fine common or down; as this mode of obtaining verdure is more speedy, and, for durability, far preferable to that of sowing the soil with grass-seeds. But, where the latter method is practised, the seeds ought to be procured from those pastures which abound with fine and clear grass. The soil should be previously dug, and carefully divested of all clods and stones: after which it ought to be covered an inch deep with good mould. The seed is then to be thickly sown, and raked over, to prevent it from being dispersed by the wind. It will, however, be advisable to mix with the seeds a considerable portion of white clover, as this will produce a finer surface, and retain its verdure much longer than any common grass.

The turf intended to be laid in gardens, ought to be selected from such commons as are free from weeds; and, if it is to be transposed to a rich soil, it will be requisite to cover its surface beneath the turf, with sand, or an indifferent mould, that the grass may not become too rank. It will also be necessary to dress the turf late in autumn, every second year, either with ashes, or tan, so that the rains may precipitate the ameliorating particles into the ground. The grass, when a few inches high, should be mowed closely, or grazed off by sheep, to prevent it from vegetating too luxuriantly; by which means it will retain its beauty for many seasons; but, if neglected, it will in a few years be overgrown with weeds.

GRASS-HOPPERS, or *Tettigoniæ*, L. are a family of insects belonging to the genus of *Gryllus*, and comprising 69 species: they all leap by the help of their hind legs, which are strong and much longer than the fore-legs. Though their walk is heavy, they fly occasionally with great speed: the females deposit several hundred eggs in clusters under ground, by means of two *laminæ* or plates appended to their tail, with which they penetrate the surface. The larvae that arise from them, resemble nearly the perfect insects, but are of a smaller size, and apparently destitute of wings: these, however, are enveloped in four excrescences or knobs, which are unfolded when the insect attains its full growth, after having four times changed its coat during the summer.

Grasshoppers do not abound in Britain, and indeed are seldom seen in any considerable numbers, on account of our variable climate. But, in the warmer countries of Asia, Africa, and Europe, especially in Spain, they commit incalculable damage, by destroying the whole vegetation of a corn-field, in a short period of time.—The only method of extirpating these predatory vermin, hitherto known, is to destroy their eggs wherever they can be discovered in the ground, either in early spring or late autumn; for, as they multiply rapidly, the extermination of the winged insects alone would not be attended with the desired effect.—For this purpose, ditches two or three feet deep, may be formed in autumn, filled with horse-dung, to which they are extremely partial, and the surface covered with a few inches of mould. In the following spring, numerous families of grasshoppers, with their eggs, will be found assembled in these ditches, where they may be readily destroyed.—See also LOCUST.

GRASSWRACK, or *Zostera*, L. a perennial native plant, of two species, the principal of which is the *marina*, or Sea-grasswrack, found on sea-shores, and in salt-water ditches near Yarmouth.

This vegetable grows at the bottom of the ocean, as common as the mosses thrive in woods: it is thrown on shore by the tide in such abundance, that mounds or dams, are constructed with its assistance, to prevent the encroachment of the sea. The green leaves are said to be an useful and durable substitute for thatch: when exposed to the air and weather, they become white.—The inhabitants of Gothland, employ the grasswrack as an excellent manure, and likewise for stuffing their beds, as it is softer than hay or straw.—Horses and swine eat this herb, but it is not relished by cows, unless mixed with hay.—The ashes obtained from the whole plant, are, with great advantage, employed by the Germans, in the manufacture of glass.

GRATES for FIRES, are composed of ribs of iron, placed at small distances from each other, so that the air may pass through the fuel, and the accumulation of ashes be, as much as possible, prevented.

Grates are peculiarly adapted to the use of pit-coal, which requires a greater draught of air to promote its burning freely, than any other kind of fuel.

In the year 1791, a patent was granted to Mr. BENJAMIN CHARLES COLLINS, of Salisbury, Wilts, for a grate on a new construction, to be used either in or out of a chimney. This invention is said to be calculated to increase the action of the air upon fire, by augmenting and directing the passage of the former through the latter. Thus the fire may be rendered so intense as to present a perfect white heat; and, as the draught of air is very great, the patentee observes, that "all, or nearly all of the unignited smoke is carried down into the fire and there consumed, instead of passing off in the common way." To effect this purpose, he constructs one or more air-flues provided with stops, by which he may at pleasure promote the draught of air to the requisite degree of heat.

Grates of this construction are asserted to be very useful for light-houses, and other places requiring a strong fire; such as laboratories, brew-houses, smelting-furnaces, glass-houses, &c.—For a more circumstantial account of this patent, we must refer the reader to the 8th vol. of the *Repertory of Arts and Manufactures*.

GRAVEL, in agriculture and gardening, is a congeries of pebbles; which, if mixed with stiff loam, make excellent and durable gravel-walks. For this purpose, the bottom should be laid with lime-rubbish, large flints, or any other hard substance, to the depth of six or eight inches, in order to prevent any weeds from shooting through the surface. Over this stratum, the gravel is to be strewed six or eight inches thick, and somewhat sloping, that all the larger stones may roll off to the sides. The next operation is that of raking, when the large stones are to be removed, and the walks carefully rolled in every direction, especially during or after hard showers: thus they will *bind*, and become very firm.

The most proper gravel for walks, is that which abounds with smooth round pebbles; for these, when mixed with a small portion of loam, are not so liable to be turned up by the feet in walking, as those of a rough and irregular shape.

Gravelly Lands or Soils are such as abound with gravel or sand, which easily admit both heat and moisture. They receive but little benefit from the latter, if there be a loose bed at the bottom, because it easily evaporates; but, if the stratum be firm, for instance, clay or stone, the moisture is too long retained, so as to chill the soil and render it unfruitful. The best method of counteracting this inconvenience, is to manure such land with chalk, which is slightly to be ploughed in, that it may not sink too deep into the ground.

As gravel constitutes the chief material of our roads, and thus becomes an article of considerable importance, we shall briefly mention a method, by which gravel or stone may be discovered *without boring*. It simply consists in observing, whether the Common White Saxifrage, or *Saxifraga granulata*, L. (which see) grows on any spot where a bed of gravel is suspected to lie: for, if that plant be discovered, it will serve as a guide to surveyors or others, where to dig with a certainty of finding the object of their search. We state this fact on the authority of Mr. T. Walford, in the 25th vol. of *Annals of Agriculture*, where an accurate representation of the Saxifrage is given.—For a method of clearing land from stone or gravel, we refer the reader to the article Stone.

GRAVEL, in medicine, is a disorder affecting chiefly the bladder and ureters; it is occasioned by a sandy or gritty substance which collects in those parts, produces considerable pain, and at length obstructs the due secretion and excretion of the urine.

Although the gravel is generally considered as the forerunner of the *calculus*, or stone, yet we are convinced from experience, that they are distinct diseases; and that those patients who are afflicted with the former, are generally exempt from the dangers of the latter.

Persons of a gouty or rheumatic habit, as well as the aged, often discharge a white-reddish gravel, which not only obstructs and suppresses the emission of urine, but by its stimulus occasions colic, vomiting, and other spasms. There is a peculiar bodily disposition required for the generation of this painful disease; but it is also remarkably promoted by the use of sour wines; hard food, or such as is with difficulty digested, especially *cheese*; a sedentary life, &c.—For the cure of the gravel, only the mildest diuretics (which see) ought to be resorted to; perspiration should be supported by gentle means, particularly by friction with warm flannel; moderate exercise is never to be neglected; and the patient's diet, as well as his mode of living in general, must be regulated by appropriate temperance, and abstinence from all heating food and drink.

GRAVELLING, a disorder incident to horses much employed in travelling. It is occasioned by small particles of gravel penetrating between the hoof and shoe, in consequence of which the part swells and festers.

The most efficacious remedy, we understand, is to remove the shoe as early as possible; to *draw* the place to the quick; to express the matter and blood gathered there, and to pick out all the gravel. The wounded foot is next to be washed with copperas-water; then to be filled up with a mixture of hot grease and turpentine; the hole stopped with the refuse of flax or hemp, and the shoe properly set on again. Meanwhile, the animal should not be suffered to work or travel, and the foot must be kept dry: thus, it is asserted, it will heal after two or three dressing.

GRAVE. See BURIAL, BURYING-GROUNDS, and FUNERAL RITES.

GRAY-MILL. See GROMWELL.

GREASE, a disorder in the heels of horses, proceeding either from a relaxation of the vessels, or a vitiated state of the blood and humours.

When a horse's heels are first observed to swell in the stable, and to subside on taking exercise, care must be taken to wash them very clean, after every journey, with soap-suds, urine, or a mixture of vinegar and water. Thus, with proper rubbing, the disease will often be effectually prevented, or removed. Or, the heels should be well bathed twice a day either with old verjuice, or the following mixture, which is well calculated to brace the relaxed vessels: Take of rectified spirit of wine 4 oz. dissolve in it ½ oz. of camphor; then add 6 oz. of wine-vinegar or verjuice, and 1 oz. of white vitriol, dissolved in a gill of water. After mixing these ingredients, cloths dipped in the liniment should be applied to the heels of the animal, and fastened with a proper bandage for a few days, during which the cure will generally be performed. A laced stocking, made of strong canvas, or coarse cloth, neatly fitted to the part affected, will afterwards be found very useful, and might be easily contrived.

But, if cracks or scratches are perceptible, which suppurate, the hair should be carefully clipped away, as well to prevent a gathering, as to admit of cleansing the animal's heels from all impurities, which would tend considerably to aggravate the disorder. Should this be the case, or if the heels be covered with hard scabs, it will be requisite to begin the cure with poultices, prepared either of boiled turnips and lard, with a handful of bruised linseed, or oatmeal and rye flour, with a little common turpentine and hog's-lard, boiled up with strong-beer grounds, or red-wine lees. Beside applying either of these poultices for two or three days, the sore parts ought at the same time to be dressed with the digestive ointment, in order to soften them, promote a discharge, and reduce the swelling; when sores may be dried up with the following absorbent: Take white vitriol and burnt alum, of each 2 oz. *Mel Ægyptiacum* (see Frush) 1 oz.; and lime-water 2 or 3 pints; wash the sores 3 times a day, with a sponge dipped in this mixture; and apply the common white ointment spread on tow, adding previously 2 drams of sugar of lead to one ounce of this salve.

When the distemper is only local, and requires no internal medicines, the method above described is generally successful; but if the horse be full and gross, his legs much gorged, so that the hair stares up, and is, as farriers term it, *pen-feathered*, discharging a fetid matter from deep foul sores, in such case it will be advisable to apply to a skilful veterinary surgeon; as the disorder is then become of a dangerous tendency.

GREASE, the fat of animals, or any unctuous matter.—See Fat, and Tallow.

Having already given (in p. 8, of this volume) some recipes for removing grease-spots from Cloth, we shall here add a few directions for discharging them from *Leather*, or other articles of wearing apparel: Take equal quantities of soft soap, and the ashes of vines; let them be well mixed together, and a small proportion of tartar and burnt roach alum be added: these articles should be thoroughly incorporated, then formed into balls, and kept in a dry place for occasional use. With such balls the spots are to be carefully rubbed, in consequence of which, it is affirmed, they will totally disappear.

Another, and more simple method, however, is to rub the leather with the white of an egg, which, when dried in the sun, will leave no trace of the spot or stain.

Greeds. See Duck-meat.

GREEN, is one of the primary colours, exhibited by the refraction of the rays of light.—See Colour.

Sap-green is a simple colour, but far inferior to verdigrease: it is prepared from the juice of buckthorn berries, evaporated to the consistence of a gum; but it frequently inclines to a yellowish colour.

Another green sometimes used is called *terra verte*, which is a native earth, probably impregnated with copper. It is of a blueish-green cast, much resembles what is called *sea-green*, but is gritty, and requires to be finely levigated before it is used. Its colour is durable, but not remarkably bright. See also p. 37.- 6. Green.

A *durable green pigment* has long been a desideratum among painters. M. Kinnman, a member of the Swedish Academy, has, at length, discovered and published the following process: Dissolve, in separate vessels, a portion of zinc in aqua fortis, and cobalt strongly calcined, in aqua regia, till the liquors are completely saturated. When both solutions are prepared, mix *two* parts of the latter with *one* part of the former; then procure a hot and clarified solution of pot-ash, *three* parts of which will be required to precipitate the mixture above specified. After it has subsided, the fluid part should be decanted, and the sediment evaporated to dryness over the fire, till it assumes a green colour. Before, however, this pigment can be used, it ought to be repeatedly washed with filtered water: thus it will become fit both for oil and water-colours, as it is sufficiently fixed to withstand the effects of the air and sun; for the inventor has ascertained its superior durability by more than ten years experience. He adds, that painters may, by means of this preparation, combine their yellow and ultramarine, so as to form a very beautiful and permanent green.

GREEN-FINCH, a species of the *Fringilla*, L. a charming little bird, which has a strong tinge of green diffused over its whole body; the wings and tail are black, but variegated with yellow.

The green-finch may be easily domesticated, by carrying it into a dark place, putting it upon one finger, and gently touching its breast with a finger of the other hand. Thus, by a few caresses, and gradually admitting day-light, this little creature may be accustomed to eat any bruised seed out of the hand, and will then continue tame.

With respect to the proper food for green-finches, and their treatment when in a diseased state, we refer to the article GOLD-FINCH.

GREEN-HOUSE, a conservatory or erection in gardens, for the purpose of sheltering the more curious and tender exotics from the effects of our variable climate, especially during the winter season.

The length of green-houses ought to be proportioned to the number of plants intended to be kept, or raised. Their depth in small houses should not exceed 12 or 14, and in large ones, 18 or 20 feet. The windows should reach from about $1\frac{1}{2}$ foot above the pavement to nearly the same distance from the ceiling, so as to admit of a cornice being constructed round the buildings, over the tops of the windows. The breadth in the smaller conservatories ought not to be more than 5 or $5\frac{1}{2}$, and in the larger ones 7 or $7\frac{1}{2}$ feet; as they will otherwise become heavy and inconvenient.

The floor ought to be paved with Purbeck-stone, or flat tiles, elevated 2, or if the situation be damp, 3 feet above the surface of the ground; it will also be advisable to carry a flue, about 10 inches wide, and 2 feet deep, beneath the floor, through the whole length of the house, and to return it along the back part, where it should be carried up into funnels, for the purpose of discharging the smoke. In the inside, shutters should be made so as to fold back upon the piers, that the rays of the sun be not impeded. The inner wall of the building ought to be either covered with stucco, or plastered with mortar, in order to exclude the frosty air. But, if the walls be wainscotted, it will be requisite to plaster the intermediate space with lime and hair: the ceiling and walls or wainscot ought, however, to be white-washed, so that the rays of the sun may be reflected throughout the building.

While the front of the conservatory is placed directly south, the two wings should be respectively arranged to face the south-east and south-west. Thus, the warmth of the sun will be reflected from one part of the green-house to the other, during the whole of the day; and the front will be effectually guarded against the cold northerly winds.

In the 2d vol. of "*Recreations in Agriculture*," Dr. ANDERSON proposes to construct a green-house, in such a manner that it may be converted into a hot-house, without requiring any additional fuel. He therefore recommends the roof to be made of glass, placed in a sloping direction; and to fix perpendicular windows on the top of the front wall, so as to raise the lower eaves of such roof considerably higher than that of the slates would have been, without elevating the middle of the roof. According to his plan, the triangular, perpendicular wall should be completely covered with glass, through which the morning and evening sun may be admitted. In the country, or in houses unconnected with others, he suggests the propriety of bringing perpendicular windows closely down to the floor, both on the east and west ends, in order to receive the benefit of the rising and setting sun.

With respect to the conversion of this structure into a *stove*, or *hot-house*, Dr. ANDERSON supposes it to be erected close to the kitchen chimney of an inhabited house. At a small distance from the bottom of the chimney, there is to be made a communication with a flue, or stove, which passes beneath, and rises on the opposite side of the green-house, where an appropriate tile is suspended from a lever which, by means of a cord fastened to its extremity, may at pleasure drop this cover on the top of the tube or flue, and thus prevent the smoke from ascending; the bottom of the cover being lined with pieces of thick cloth, so that it may apply closely and become air-tight. A valve is likewise placed in the chimney, which turns on a pivot, so as either to allow the smoke a free passage, or to impel it into the flue, whence, after parting with its heat, it is either suffered to escape at the top, or is reverberated, accordingly as the covering tile before alluded to, is shut or opened.

For a more ample account of this project, we refer the reader to the 2d vol. of Dr. ANDERSON's instructive work above cited, where it is illustrated by cuts.—We have here given an outline of his plan, because it is ingenious, and may lead to farther improvements.

With respect to the management of plants in green-houses, MORTIMER recommends occasionally to open the mould in which they are set, to scatter a little fresh earth on the pots, and over this to lay a little dung. It will also be advisable to water them, when the leaves begin to curl or wither; and to pluck off such as are decayed; but these operations should not be too frequently repeated.—See HOT-HOUSE.

GREEN-SICKNESS, or *Chlorosis*, a disorder which frequently attacks females after the age of puberty. It is attended with a depraved appetite, and a desire to eat substances that are not food, such as chalk, ashes, salt, &c.; the skin is pale and discoloured; the face sallow or greenish, but sometimes of a livid hue; there is a deficiency of blood in the veins; with a soft swelling of the whole body, especially the legs during the night; debility; palpitation; and suppression of catamenia.

Causes.—A sedentary life; scanty,

ty, or indigestible food; obstructions of the bowels; and frequently also, inordinate passions.

Cure.—Although the experience of all ages has attested, that the most certain relief in this female complaint is a change from a single to a connubial state, yet as this expedient is not always convenient, the following plan should be steadily pursued: A nourishing diet, with an allowance of generous wine, in small quantities; abstinence from acids, spirituous liquors, and whatever may suddenly heat or cool the body; moderate daily exercise, especially on horseback; or, if that cannot be procured, general friction of the whole frame with warm flannel every morning and evening; sleeping on mattresses, instead of soft feather-beds; early rising, and chearful company. Beside these general regulations, it will be useful to keep the bowels continually open, by taking small doses of vitriolated tartar, a scruple or half a dram, to be repeated four or six times when necessary in one day; to bathe the lower extremities frequently in warm water, and to wear worsted stockings in preference to silk or cotton; to apply the steam of hot water with due precaution; and lastly, to resort to the tepid bath every other day, or as often as is compatible with the strength of the patient.—If, nevertheless, these gentle means prove unsuccessful, the more powerful remedies, such as chalybeates, bitters, mercurials, &c. must be prescribed by the profession.—In some of the most tedious and inveterate cases of chlorosis, almost immediate relief was obtained by inhaling dephlogisticated air, or oxygen gas, which, however, should be administered only by persons sufficiently acquainted with the nature of that powerful agent.

GREY-HOUND, the COMMON, or *Canis Graius*, L. is a dog remarkable for his swiftness, strength, and sagacity, in pursuing game.—There are several varieties, such as the Italian, the Oriental, and the Highland Greyhound: the last of which is now become exceedingly scarce.

A good grey-hound ought to have a long, and rather large body; a neat pointed head, sparkling eyes, a long mouth, with sharp teeth, small ears, formed of a thin cartilage; a broad, and strong breast; his fore-legs straight and short; his hind-legs long and limber; broad shoulders, round ribs, muscular buttocks, but not fat, and a long tail, strong and full of sinews.

In the breeding of these animals, the female is principally to be regarded; though both should, as nearly as possible, be of the same age, which ought not to exceed four years.

The food of grey-hounds ought to consist of chippings, or raspings of bread, with soft bones and gristles; these should always be soaked in beef or mutton broth, and, when nearly cold, some milk may be added. On this diet, they should be fed morning and evening, which will greatly contribute to preserve them in health and spirits. But if, nevertheless, the dog should become sick or weakly, we understand that a rich broth, prepared by boiling a sheep's head together with the wool, in a sufficient quantity of water, with the addition of some oatmeal, and given to the animal alternately with the flesh, will speedily promote his recovery.

The proper exercise for a greyhound is coursing three times a week; and, if he be consequently rewarded with blood, it will animate and encourage him to pursue game. After the chace, he should be led home, his legs washed with beer and butter, and in about an hour, he may be fed.

GRIEF, or an increased and continued degree of sorrow, is one of the depressing passions. Its influence on the body is remarkable; and its effects, with few exceptions, are similar to those of *fear*.

Grief diminishes bodily strength in general, and the action of the heart in particular. The circulation of the fluids is thus impeded; the bile stagnates, and occasions indurations of the liver; or, by mixing with the blood, it produces either jaundice or dropsy. Grief also diminishes perspiration, renders the skin sallow, aggravates the scurvy, but particularly putrid fevers, and disposes persons to become easily infected with them.—Its effects in changing the colour of the hair, are well known; and instances have occurred, in which the hair has been turned from a deep black to a grey colour, in 24 hours. Blindness, gangrene, and even sudden death, or, as it is emphatically called, a *broken heart*, have resulted from the excess of this passion.—Persons who indulge in *fretting*, become at length in a high degree peevish and irritable: from the constant return of sorrow, the mind beholds new food for it in every object. Thus, the whole imagination is seriously affected, and the most profound melancholy, together with a nervous fever, or, which is still more dreadful, with total insanity, are the inevitable consequences.

Consolatory arguments being the first remedy that can be administered, recourse should be had to whatever is chearful, or calculated to dispel thought, and to divert the mind from brooding over its real or imaginary woes. Gentle opiates, cautiously taken, may occasionally be of great service in this preying disease; but daily exercise in the open air must on no account be neglected; the body should be frequently rubbed with dry cloths, and perfumed with vinegar, amber, or other fragrant matters: the tepid bath will also be found of eminent advantage; and, if possible, the patient ought to be removed to a more genial climate.—Mild wines, if drunk with moderation, will be often productive of the happiest effects; but, if they be intemperately used, their strong tendency to generate an acid, cannot fail to deprave the appetite, and disorder the stomach.

GRIPES, or COLIC, in Farriery, a disorder, with which horses are frequently affected. As it arises from various causes, its treatment must necessarily differ; and as the most judicious farriers have divided this malady into three species, we have adopted such division, because there is no distemper incident to that useful animal, which is more frequently mismanaged by ignorant pretenders, and consequently becomes incurable.

The first species is the *flatulent* colic, which is generally occasioned by wind in the bowels, after drinking cold water, when the horse is hot; or the perspirable matter is retained, and repelled on the bowels, by catching cold: in either case, those parts become violently distended.—This species of the disease may be distinguished by the rumbling of confined air in the intestines, and the restlessness of the animal affected, which often lies down, and rises almost instantly with a violent spring; striking his belly with his hinder feet, stamping with those before, and refusing his food. The horse is frequently attacked with a kind of convulsions, and falls into profuse sweats, which are quickly succeeded by cold damps. He strives repeatedly to stale, turning his head to his flanks, rolling on the ground, and frequently lying on his back. The symptom last mentioned arises from a retention of urine, which generally attends the flatulent colic, and is often increased by an accumulation of dung pressing on the neck of the bladder.—The first remedy is, to introduce into the straight gut, a small hand dipped in oil, by which the confined air obtains a passage; and, the neck of the bladder being thus relieved, the suppression of urine will be removed. Next, the following preparation will be of considerable service: Take half an ounce of Venice turpentine, and a similar quantity of juniper-berries pounded; one ounce of salt-petre, one dram of oil of juniper, and two drams of salt of tartar. Let these ingredients be formed into a ball with syrup, and given to the animal affected; after which it may be washed down with a decoction of juniper-berries, or with a little ale.—But, if the horse neither break wind, nor stale plentifully, it will be requisite to repeat the ball at the expiration of two hours, with the addition of one dram of salt of amber. He should likewise be gently exercised during the continuance of the fit.—A clyster may be given either during the interval of taking the balls, or alone, and occasionally repeated: for this purpose farriers use the following ingredients, viz. Two handfuls of chamomile flowers, an ounce of anise-seeds, and a similar quantity of fennel and coriander seeds: these are to be boiled in three quarts of water, till they are reduced to two; when half a pint of gin should be added, together with half an ounce of oil of amber, and eight ounces of oil of chamomile, We conceive, however, that instead of the last three expensive articles, a pint of common, or linseed oil, will answer a similar purpose.—By a judicious application of these remedies, the animal will be considerably relieved; and, if his restlessness cease, and he continue quiet for an hour or longer, no danger need be apprehended.

2. The *bilious*, or *inflammatory* gripes, are attended with the same symptoms as the flatulent colic, together with a considerable degree of fever, panting, and dryness of the mouth. The horse frequently discharges a small quantity of dung, together with a hot scalding water, If the urine appear of a blackish, or reddish colour, accompanied with a fetid smell, a mortification will speedily ensue. — To counteract these dangerous symptoms, the distempered animal should immediately lose three quarts of blood; which operation ought to be repeated, unless a favourable change take place within three hours. The clyster above-mentioned, should be injected thrice a-day, with the addition of two ounces of nitre dissolved in water: large draughts of gum-water should be allowed, and a pint of the following drink ad-

ministered every three hours, till several loose stools are procured; when it may be repeated every night and morning, till the disorder be removed: Let three ounces of senna, and half an ounce of salt of tartar be infused in two quarts of boiling water, for one or two hours; when the liquor should be strained, adding two ounces of the common lenitive electuary, and four ounces of GLAUBER's salt. If, notwithstanding these remedies, the inflammatory symptoms become more violent, the event will in general be fatal. A strong decoction of Peruvian bark is the only medicine that may probably afford relief; a pint of which ought to be given every three hours, with half a pint of Port-wine.

3. The *dry gripes* arise chiefly from costiveness; they are known by the animal's restlessness, and frequent but unsuccessful attempts to dung. In this case, the straight gut should be relieved in the manner above directed for the flatulent colic; an emollient clyster, consisting of two or three quarts of thin water gruel, six ounces of sugar, and an equal quantity of salad-oil, should be injected lukewarm, three times in the course of twenty-four hours; and the purging drink, prescribed for the inflammatory gripes, may be given till the bowels be unloaded, and the symptoms abate.

The proper diet for horses attacked with either species of this painful disorder, ought to be scalded bran, thin water-gruel, or what is called by farriers *white water*; which is prepared by dissolving four ounces of gum arabic in two quarts of water, and mixing the whole with the animal's usual drink.

GROMWELL, or *Lithospermum*, L. a genus of perennial plants, comprising several species, the principal of which are:

1. The *officinale*, Common Gromwell, or Gromill, Gray-mill, or Gray-millet, which grows in dry gravelly soils, and flowers in the months of May and June.—The seed of this plant affords excellent flour, which might in times of scarcity be converted into bread. From the rind of the root, a red colour may be extracted, and it is also employed in the North of Europe as an inoffensive paint for the face, especially by country-girls. Its seeds were formerly medicinal, but possess no peculiar properties; though HALLER observes that the plant itself is narcotic.

2. The *arvense*, Corn, or Bastard Gromwell, Gromill, or Alkanet; a noxious weed, which is common in corn-fields, and flowers also in May and June.—The juice of the root is likewise used as a paint: its rind tinges wax and oil of a fine red colour, similar to that which is obtained from the root of the foreign Alkanet.—Sheep and goats eat the Bastard Gromwell, but cows do not relish it; and it is totally refused by hogs and horses.

GROUND-ASH. See GOUT-WEED.

GROUND-FURZE. See REST-HARROW.

GROUND-IVY, GILL, or ALE-HOOF, *Glechoma Hederacea*, L. an indigenous plant, thriving in groves, hedges, and shady places; flowering in the months of April and May.

Ground-ivy has a peculiar strong odour; it is of a bitter and slightly aromatic taste. Its leaves contain an essential oil, destitute of smell. This plant was formerly held in great estimation, and supposed to possess eminent medicinal virtues; but which are not confirmed by later experience. In obstinate coughs, it is still a favourite remedy with the poor, who probably experience its good effects by persevering in its use, and abstaining from animal food.

The expressed juice mixed with a little wine, and applied morning and evening, is said to destroy the white specks sometimes occurring on the eyes of horses.

It is observable, that plants growing near the ground-ivy, do not prosper; and that this vegetable proves hurtful to horses, if they eat it in any quantity; nor should it be given to diseased sheep, though it is a grateful and salutary food to them, when in health. But horses are not very partial to it; and it is totally refused by cows, hogs, and goats.

GROUND-NUTS, or GROUND-PEASE, the *Arrachis Hypogaios Americanus* of RAY, a plant cultivated in the West Indies by the Negroes. When in flower, it inclines towards the earth, into which the pointal enters, and extends to a certain depth, where the seed-vessel and fruit are formed; so that the latter attains to maturity under ground. As large crops of this vegetable are produced on light sandy lands, of little value, it may perhaps be advantageously cultivated in the southern counties of Britain.

The seeds or fruit, when bruised and expressed through canvas bags, afford a pure, clear, and savory oil, which, in the opinion of Dr. WATSON, may be used for the same purposes, both culinary and medicinal, as those obtained from olives or almonds. The oil of ground-nuts, however, possesses a great advantage, as it will admit of being kept for a considerable time, without becoming rancid, or requiring any particular care, even during the heat of summer. As one bushel of the seeds, when expressed, yields a gallon of pure oil without, and a much larger quantity, though of inferior quality, with the aid of heat, they deserve to be more generally known and imported. The value of a bushel of these nuts, in South Carolina, did not exceed eight-pence in the year 1768, when specimens of the seeds were produced before the Royal Society, and an account given in the 59th vol. of their *Philosophical Transactions* for 1769.

GROUND PINE, or *Ajuga Chamæpitys*, L. an indigenous plant growing in sandy fallows, and flowering in the months of April and June. It possesses a bitter and acrimonious taste, and though it has often been recommended as a medicine for the cure of the gout, jaundice, and intermitting fevers, yet its real efficacy in these diseases is not ascertained.

GROUNDSEL, the COMMON, or *Senecio vulgaris*, L. an indigenous plant, growing on cultivated grounds, rubbish, and in court-yards; it flowers from April to September. A strong infusion of this weed excites vomiting; the bruised leaves afford a refrigerant and healing application to boils.—Its seeds are very agreeable to gold-finches and linnets confined in cages.—Cows do not relish this plant: it is, however, eaten by goats and swine, but refused by horses and sheep.

There is another useful species of the groundsel, the *Senecio Jacobœa*; for which we refer to RAG-WORT.

GROUSE, or GROWSE, *Tetrao tetrix*, L. a native bird, which is found in woody and mountainous situations, chiefly in North Britain. The male is two feet in length, and weighs nearly four pounds; while the female is only about half that length and weight: she deposits six or seven eggs, which are hatched late in the summer; and the young birds subsist at first on ants' eggs, and wild mountain berries.

Towards autumn, grouse frequently descend from the mountains, and feed on corn: as they grow older, their principal food is derived from the tops of heath, and the cones of the pine-tree, by which they acquire a delicate flavour, and are speedily fattened. At present, these birds are rarely found in England, though *grouse-shooting* is a favourite sport in various parts of Scotland.

GROVE, in gardening, is a small wood impervious to the rays of the sun.

Groves constitute one of the chief ornaments of our gardens: they also afford the greatest relief against the scorching rays of the sun, while the rest of the garden is parched with heat; so that without a grove, every large garden must be defective.

Groves are either open or close. The former are composed of large shady trees, arranged at such distances as to prevent the rays of the sun from penetrating through their intertwining branches. Close groves frequently contain large trees; but the ground beneath is so thickly planted with shrubs as to form private walks, sheltered from the wind. These are often contrived, in order to bound the open groves, or to conceal the walls or other inclosures of the garden: and, when properly laid out, with dry walks winding through them, between fragrant shrubs and flowers apparently irregular, they have a most pleasing effect.

In the planting of groves, the trees should be placed at diagonal intervals, by which mode they will acquire a more noble appearance, and also form a shade much sooner than such as are planted in direct lines.

GRUB, in ZOOLOGY, the English name for worms, or maggots, hatched from the eggs of beetles.

Grubs are an excellent bait for many kinds of fish. In angling for the grayling (see UMBER) as well as trout, the *ash-grub* is preferable to all others. This insect is of a milk-white colour, a plump round form, with a red head. There is another very common grub, which is longer and thinner than the ash-grub; has also a red head, but two rows of legs along the belly; it is tougher and yellower. To preserve grubs, they should be kept in bran, which will render them very firm; but the ash-grub is always so tender, that it can with difficulty be employed as a bait: hence, it should be wrapped in a piece of stiff hair with the arming, and about a straw's breadth left to project at the head of the hook, to prevent the grub from sliding off, when baited. The horse-hair must be white, or of a colour perfectly resembling that of the bait; as otherwise it will be suspected by the fish.—For the different methods of destroying grubs, in general, see CHAFER.

GRUBBING, in agriculture, a term used by farmers to denote the extirpation of trees.

Old trees which are past growing should be taken up by the roots, and young ones planted in their stead. This is, in most places, a tedious operation, though in some counties a machine is employed for this purpose, which considerably facilitates the labour and lessens the expence of removing the roots. It consists of an iron hook, about two feet and a half long, with a large iron ring affixed to its handle. The ground about the root being cleared away, and the straggling horizontal roots cut off, the point of the hook is fastened to some part of the stump; and a long lever of sufficient strength placed through the ring. Thus arranged, two men at the extremity of the lever force it in every direction, till the root is torn out, twisting off the tap-roots at some distance under ground.

This method appears to be very effectual in stubbing up the roots of underwood; but, when those of very large trees are to be extracted, it will be advisable previously to cleave them with wedges into several parts, and then to take them up separately.—See also BERNE-MACHINE: vol. i. p. 253.

GUAIACUM, or *Lignum vitæ*, L. is a genus of plants producing three species, the principal of which is the *officinale*, or Common Lignum Vitæ, a native of the West Indies.—It may, in colder climates, be propagated by seeds sown in pots plunged into a hot-bed, but it is seldom cultivated in this country.

The wood of this species is of equal utility in the mechanical arts, and in medicine; being so heavy as to sink when immersed in water. It is chiefly employed in the West Indies for the wheels and cogs of sugar-mills, and is also frequently formed into mortars, bowls, and other utensils.

The wood, gum, and bark, are all employed in medicine, though the two first are chiefly used in Europe.

Gum Guaiacum is of a friable nature, of a deep greenish colour, but sometimes of a reddish hue; and has a pungent acrid taste.—There is another spontaneous exudation obtained from the bark of this tree, which is called *native gum*; it is imported in small irregular, semi-pellucid pieces; and is much purer than that extracted by incision.

The general virtues of Guaiacum are those of a warm aromatic medicine: it strengthens the stomach and other viscera, and greatly promotes the discharges of urine and perspiration. Hence it is of especial service in cutaneous eruptions, and disorders arising from obstructions of the excretory glands:—in rheumatic and other pains, unattended with fever, the liberal use of gum guaiacum has often afforded considerable relief. It is likewise a good laxative, and furnishes a more active medicine than either the wood or bark of this tree.

Gum Guaiacum, when dissolved in rum, or combined with water, by means of mucilage or the yolk of an egg, or in the form of a tincture or elixir, has been found useful in chronic rheumatism, or even in such wandering pains of the stomach or other parts of the body, as could be attributed to the retrocedent gout; in which cases a small table-spoonful of the emulsion may be taken three or four times a day.

GUDGEON, in Ichthyology, is a species of the *Barbus*, or BARBEL; which see. It inhabits most running waters, small streams, such as the river Lea, and is found in great abundance in the New River, near London. Though small, this fish is highly esteemed for its fine flavour.

Gudgeons generally hide themselves under weeds, in rough water, and among the sedge growing at the sides of rivers, particularly during the spawning season, which commences about the middle of April, and terminates with the month of May. When full of spawn, they are of a superior flavour, and this period includes the latter part of March, and the first half of April.

The proper season for taking gudgeon is in the months of March, April, and May, but the rods, lines, baits, &c. differ in several material respects, according to the particular time of the year fixed upon for angling. In general, however, the rods should be of a small size, and the line a single horse-hair, or that of a goat may be substituted. The hooks should also be very small, three or four of which must be affixed to each line, at the distance of six inches from each other; and the depths at which the sportsman is to angle, vary according to the season of the year, the nature of the water, and other circumstances. The most general bait for gudgeons are, blood-worms and white-paste.

On taking his stand, the angler may throw in bread as a ground-bait; but the common method of disturbing the bed of the river with a rake, should be adopted only in warm seasons. Sometimes it is attended with good effects to *plumb* the bottom, or at least to drop the plummet rather deep. A curious double plugged float, and small shot, fixed at about three inches from the hook, is generally used with success in catching these fish.

GUELDER-ROSE, or *Viburnum*, L. a genus of plants comprising twenty-two species, two of which are natives of Britain.

1. The *Lantana*, Mealy Guelder-rose, Pliant Mealy Tree, or Wayfaring Tree, which grows in calcareous soils to the height of 18 or 20 feet, in woods and hedges; it produces large white flowers in May, and black farinaceous berries in October. The young branches and rind of the trunk of this species may be employed for bands and cords. It is, however, chiefly esteemed for its beautiful foliage, which renders it an ornament to parks and plantations. The bark of its root is used for the preparation of bird-lime; the berries attract birds, and are of a drying, astringent nature.

2. The *Opulus*, Common Guelder-rose, or Water Elder, which grows in woods and damp hedges; bears white blossoms in May or June, and red berries in September.—When in bloom, this tree exhibits a singularly fine appearance: the flowers, though small, are formed into large globular umbels, whence it is sometimes called the *Snow-ball tree*.—Birds are enticed by the red berries, but will not eat them.—According to Bechstein, these berries may be preserved in vinegar, and the tough, hard wood is employed by shoemakers for small pegs of heels.

GUINEA, a British gold coin, thus denominated, because the precious ore from which the first guineas were coined, was originally imported from the coast of Guinea.

The value or rate of this coin has frequently varied: when first struck, its current price was 20s.; on account of the scarcity of gold, it afterwards advanced to 21s.

and 6d.; but its present *nominal* value is 21s.

If the pound weight (troy) of gold be divided into 89 parts, each of them will be equal to half a guinea, so that 12 ounces contain 44½ guineas.—As this favourite coin is gradually disappearing, we think it superfluous to state its accurate proportion of pure gold and alloy;—it has been confidently reported, that English guineas have lately been exchanged on the Continent, and especially in Hamburgh, at from 24 to 25 shillings. Such temptations, however, will induce only those persons to profit by the opportunity, who are now almost exclusively in the possession of *gold*, while they accommodate us with *paper*.

GUINEA-GRASS, a valuable species of herbage, thus denominated, as it was first discovered on the coast of Guinea, whence it was brought to Jamaica, and afterwards imported into this country.

In point of real utility, this plant ranks, in Jamaica, next the sugar-cane; for the breeding farms throughout the island were originally established, and are still supported, chiefly by means of the Guinea-grass, which bestows verdure and fertility on lands that would otherwise not deserve to be cultivated.—About ten years since, it was also introduced into the East Indies, where it is now successfully cultivated, and grows to the height of seven feet: it admits of being frequently cut, and makes excellent hay. Cattle eat it, both in a fresh and dry state, with great avidity: hence the culture of this valuable herbage has been strongly recommended to the farmers of Cornwall and Devonshire.

GUINEA-HEN, or *Numida meleagris*, L. an exotic species of gallinaceous fowl, which is a native of Africa. Its body is sloped in a manner similar to that of a partridge, and its dark grey colour is beautifully variegated with white spots.

Guinea-hens are not so tame and domestic as our native fowls, and frequently occasion considerable trouble to their keepers, by flying into hedges and bushes, especially during the night, where they lay, and hatch their eggs, of which they frequently deposit from 100 to 150. Nevertheless, they breed tolerably well in this climate; their flesh is generally white, tender, and sweet, though it is sometimes found perfectly black.

GUINEA-PIG, or, as it is more properly termed, the Restless Cavy, *Cavia Cobaya*, is not a native of Guinea, but of Brasil, whence it has been imported into Europe.—It is about seven inches in length, and its white body is variegated with irregular black and orange-coloured spots. The female breeds at two months old, and brings forth ten, twelve, or fourteen young ones, several times in the course of the year, after a gestation of three weeks.

Guinea-pigs feed on all kinds of herbs, but are particularly fond of parsley, as likewise of apples and other fruit. In their wild state, they multiply prodigiously, and would become innumerable, if they were capable of sustaining cold and moisture. Cats are their natural enemies; but their haunts being supposed to be exempt from the inroads of rats, guinea-pigs might be usefully reared in country places infested with those predatory animals; as they afford a palatable and wholesome food. In a domestic state, they are very restless, and make a continual noise, similar to the grunt of a young pig.

GUINEA-WHEAT. See MAIZE.

GULL, or *Larus*, in ornithology, a genus of aquatic birds, comprising eleven species, the most remarkable of which is the *parasiticus*, or DUNG-HUNTER: it is about 21 inches in length; the upper parts of its body, wings, and tail, are black; the lower part of the breast dusky, &c. It commonly frequents the Hebrides in the month of May, and retires about August. It is also found in the Orkney Islands, and on the coasts of Yorkshire, where it is called the *feaser*. The female constructs her nest of grass and moss, on a hillock, in some marshy situation in which she deposits two ash-coloured eggs spotted with black, and about the size of those of a hen.—FUNKE, a German naturalist, informs us that these eggs are found in such numbers, on an island which is uninhabited, in the vicinity of Amsterdam, that it is lett at the annual rent of 20,000 florins.

Gulls, in general, fly but slowly; though, when in pursuit of other birds, they often attack and compel them to disgorge the fish, or other food, which the gulls devour with avidity.

GULLET, or *Oesophagus*, in anatomy, is a long, round, and capacious tube, destined to convey the food from the mouth into the stomach. It descends between the windpipe (which see) and the joints of the neck and back, as far as the fifth joint of the spine, where it turns somewhat to the right till it arrives at the ninth; where it again changes its direction towards the left, climbs over the *aorta*, or the largest blood-vessel in the human body; and, after rising above it, penetrates the midriff, and then extends to the left orifice of the stomach.

Instead of enlarging upon the situation and structure of the gullet, we shall give a few directions for removing *substances stopt between the mouth and the stomach.*

If the matter detained within the gullet, is of an alimentary or harmless nature, it may then safely be pushed down by means of a heated and oiled wax-candle, to render it flexible; because the manner in which the obstruction is formed, may often occasion death.

On the contrary, if the substances swallowed are indigestible, such as pins, needles, pieces of bone, glass, buckles or other pointed bodies, immediate attempts should be made to extract them: When they have not descended too low, the fingers will frequently be sufficient to reach and withdraw them, but if they be deeper within the gullet, other means must be instantly adopted; as delay may prove fatal. For this purpose, the most simple instrument is a crotchet, or a kind of hook, made of smooth and thin iron wire, by bending it into an oblong ring at one end, reflecting the wire to the top, and forming a large handle: thus, no pointed part will injure the throat by introducing the hook; and there will be no danger of its slipping from the operator's hand. We have seen a more effectual instrument contrived by a double and triple ring of thin wires crossing each other in an oval form, so as to leave spaces between them, in order to loosen and extract a pin, or other sharp substance: the handle must, in either case, be somewhat bent, and accommodated to the curve of the neck.

As, however, the construction of such a crotchet requires some ingenuity; and as wires may not always be at hand, there is another more simple and expeditious method of procuring relief, by means of a small piece of dry sponge, or tough meat, which should be fastened to a fine silken or linen tape, so that after swallowing the sponge or meat, it may again be gradually extracted. Thus we have frequently seen pins, or sharp pieces of bone, removed without farther inconvenience. In order to facilitate the operation, a little lukewarm milk or water should be swallowed by the patient, before the string is withdrawn from the throat.

If, however, none of these expedients prove successful, it will be necessary either to administer an emetic, consisting of half a dram of ipecacuanha in powder, to be taken in a draught; or, if the patient be unable to swallow, to excite vomiting by stimulating his throat with a feather dipped in sweet oil;—and, if this attempt likewise be ineffectual, a clyster, made by boiling one ounce of tobacco in three quarters of a pint of water, and then straining the decoction, should be given in dangerous cases;—such an injection has often been attended with speedy vomiting, and the consequent discharge of the substance which obstructed the gullet.

After these remedies have been fairly tried, no other prospect remains of saving the patient's life, than by opening the wind-pipe, an operation which, in the hands of a skilful surgeon, is neither difficult, nor painful to the person threatened with suffocation.

GUM, a concrete vegetable juice which possesses no peculiar smell, or taste; it forms a viscid or mucilaginous solution in water, but is not acted upon either by spirits, or oils: it burns in fire without melting or inflaming, and is not dissipated by evaporation.

Gums are divided into two classes, *genuine* and *impure*. In the former class are Gum Arabic, Gum Senega, and Gum Tragacanth; the gums of plum and cherry trees, &c. The latter are such as contain a greater or less proportion of resin.

Gum Arabic exudes from the *Mimosa Nilotica*, or Egyptian Acacia, which abounds in Africa; but according to Dr. SWEDIAUR, it is chiefly obtained by boiling the roots of certain trees growing in Egypt. The best gum used in this country is of a pale yellowish colour. On account of its glutinous properties, it is preferred as a demulcent in coughs, hoarseness, and other cattarrhal affections, in order to obtund or mitigate irritating acrimonious humours, and to supply the loss of abraded mucus. It has been very generally employed in stranguries, and other urinary complaints.

Gum Ammoniac. See vol. i. p. 41.

Gum Copal. See COPAL.

Gum Guaiacum. See GUAIACUM.

Gum Kino. See KINO.

Gum Lac. See LAC.

Gum Senega. See SENEGA.

Gum Tragacanth. See TRAGACANTH.

Gum Elemi exudes from the *Amyris elemifera*, a native of South America, whence it is imported, and sometimes also brought from the East Indies. The best sort is rather soft and transparent, of a pale yellowish colour, inclining to green; and of a strong but pleasing smell. It was formerly employed more than it is at present, in the *compound ointment of Elemi*, which has long been used for digesting and cleansing ulcers.

Besides its utility in medicine, *gum* is of considerable service in the Arts; and, as sufficient quantities of it cannot always be procured genuine, different persons have endeavoured to contrive such substitutes, as would effectually answer the same purposes.—From these, we have selected the following, as being most easily prepared, and chiefly from substances produced in this country:

The first is the invention of Mr. ALBERT ANGELL, of Bethnal-green, Middlesex, to whom a patent was granted in January 1781, for his *Britannic Elastic Gum.* This preparation consists of one gallon of linseed, or nut-oil, 1lb. of bees-wax, 6lbs. of glue or size, $\frac{1}{4}$ lb. of verdigrease, a similar quantity of litharge, and two quarts of spring or rain-water. These ingredients are to be melted in an iron kettle, till they acquire the consistence of gum.—The patentee observes, that such composition is particularly serviceable in the various branches of portrait and house-painting, as it renders the colours durable, and free from *peeling*; it is also said to be of great utility in the gilding, painting, &c. of silks, calicoes, &c. and in dressing silk, linen, or cotton, in the loom, instead of gum or paste, so as to strengthen the threads of the finest cottons. He states a variety of other uses, a minute account of which the curious reader will find in the 3d vol. of the "*Repertory of Arts and Manufactures.*"

Another patent was obtained in June 1788, by Mr. FRANCIS BLAIKIE, of Glasgow, merchant, for the invention (discovered to him) of a substitute for gum, in thickening colours for printing, which fully answers the purpose, and at a more reasonable rate.—This article is prepared by boiling flax-seed in water, till the whole substance is completely extracted; the liquor is next to be strained through a linen or woollen cloth, and boiled down to the consistence of a jelly. It is then to be put into a close vessel, and a small quantity of spirits, or sweet oil, poured on the top, in order to preserve it in a fresh state.—In using this substitute, the printer is directed to put a certain portion into a gallon of *colour*, according to the nature of the latter, and the particular kind of work; while he should regulate himself by trial, in the same manner as is practised in employing common gum.

GUM, or GUM-SECRETION, in horticulture, is a kind of gangrene, or morbid production of gummy matter, exuding from the wounded alburnum or sap-wood of deciduous trees, whether the injury be caused by internal disease, or by external violence, as is the case in canker.

Cherry and other stone-fruit trees are particularly affected with this exudation of gum, which, however, concretes in dry weather, and thus its farther discharge is prevented: otherwise the tree would *weep*, and perish from a deficiency of nourishment.

Dr. DARWIN conjectures this gummy substance to be part of the nutritious fluid designed for the new buds, which are usually formed in the summer. He proposes to obviate its exudation, by fastening a thin plate of lead on the part affected, which is previously made smooth with a knife, so that no rain or dew can penetrate: a piece of sponge, soft leather, or India rubber, might be bound on the tree beneath the lead, till the wound is healed.—The Doctor suggests another method of closing the wound; namely, to cut out a piece of bark from a tree of inferior value, but similar nature; to adapt it to the wounded part, after its edges are nicely smoothed, and to tie it on with list, flannel, or other bandage; in order that its elasticity may secure a continual pressure, without injuring the bark.

Mr. Bucknall, who has made some ingenious observations on the formation of gum, in the 12th vol. of the "*Transactions of the Society for the Encouragement of Arts*," &c. disapproves of smearing the diseased tree with tar, or any other substance that may impede the proper circulation and perspiration of the juices, as it must necessarily hurt the tree. The best remedy, in his opinion, is the *medication* (see vol. i. p. 432); for, being applied simply like a plaster, and not being extended farther than is required by the bare wood or torn bark where the gum oozes forth, it is not attended with those unfavourable effects. He farther assures the Society, that in each of these cases, " the medication becomes supremely salutary," on account of its drying qualities; for the wounds heal in one half of the time they would close, when exposed to heat, cold, moisture, and vermin.

GUM-BOIL, *Parulis*, is an affection of the gums, commencing with inflammation, and generally terminating in an abscess.

Gum-boils usually arise from violent pains in the teeth. They are to be treated with discutients, like other inflammatory tumors; but, if these fail, or the disorder be neglected, it is apt to produce a fistula. A gargle prepared of an infusion of sage, chamomile, and elder-flowers boiled in milk and water, may with advantage be frequently held in the mouth, and the remaining herbs sewed up in a bag, and applied to the cheek; or, a half-roasted fig held within the mouth to the part affected, sometimes affords great relief. When the softness of the tumor evinces that the matter is properly suppurated, it should without delay be opened by the lancet, to prevent the matter from lodging there, eroding the bone, and causing a fistula, or caries. After this operation is performed, the matter should be gently pressed out with the fingers, and the mouth frequently washed with lukewarm Port-wine and water.

But, when the ulcer has penetrated to a considerable depth, it will be necessary to inject the last-mentioned mixture with a syringe, and compress the part affected by a proper external bandage. If the affection assume a fistulous appearance, and have callous edges, it may even then be cured, by injecting the compound tincture of aloes, and continuing it for some time. Should, however, all these remedies prove ineffectual, the fistula must be laid open by incision, and the caries removed by medicines, caustics, or the actual cautery.

GUMS, in anatomy, are hard

fleshy subtances in both jaws, surrounding the teeth, and keeping them firm in their sockets.

Gums frequently become spongy, and separate from the teeth: this is often occasioned by a tartarous kind of crust, which is formed about them, and, on the separation of which, the gums return to their pristine state: to promote this favourable change, they should occasionally, though gently, be rubbed with a mixture, consisting of four parts of an infusion of roses, and one part of the tincture of myrrh.

Another disorder incident to human gums is the scurvy, which frequently breaks out on them, while it does not appear on any other part of the body. Indeed, when a scorbutic complaint attacks the whole system, the first symptom is a putrid state of the gums. In such case, a rigid diet, consisting chiefly of ripe fruit and mucilaginous vegetables, will be the best corrective. Externally, a fine powder, prepared of three parts of double-refined sugar, and one part of burnt alum, may be employed for rubbing them two or three times a day; because sugar is an excellent antiseptic, even as an article of diet: a whole ship's company has been cured of a formidable scurvy, by living from necessity, for some time, on no other aliment.

GUN, or MUSQUET, in the military art, is a kind of fire-arms, or weapon of offence, which forcibly discharges a ball, or other hard and solid substance, through a cylindrical tube, by means of inflamed gunpowder.

Although the precise time when these instruments of death were first invented, is involved in obscurity, yet the introduction of guns into the western part of the world, is but of modern date.

Among the various patents obtained by gun-makers, we shall only mention one granted in 1801, to Mr. JOHN PROSSER, of Charing-cross, London, sword-cutler, for a new-contrived *water-proof pan and hammer*, for gun and pistol locks.—The invention consists in applying a hammer of nearly the usual form, but instead of the common plain screw-pin round which it revolves, and which attaches it to the stock, the patentee has substituted a very large pin, of sufficient dimensions to allow of its being hollowed out and perforated, and in the axis of the hammer he places the pan to contain the priming, and to communicate the fire to the chamber of the piece.—See also FIRE-ARMS.

As numerous misfortunes happen with loaded guns and pistols, especially to careless youth and children, we suggest the propriety of removing the *flint* every time fire-arms are carried into a house; or never to suffer young people to touch them. Indeed, the artist who will contrive a moveable hammer, or at least the upper part of the hammer containing the flint, which might be easily and instantly fixed on the spur of the occasion, would be the instrument of saving many useful lives, and well deserve to be rewarded by the public; for all other inventions of stop-locks, &c. do not afford sufficient security.

GUNPOWDER, a granulated composition of salt-petre, sulphur, and charcoal, which readily takes fire, and when secluded from the air, rarefies or expands with great vehemence, by means of its elastic force.

The invention of gunpowder is attributed to Barthold Schwartz, a German monk; but there is reason to believe it was not unknown in the time of Alexander the Great; and that, Roger Bacon, in 1292, understood the nature of its component parts; though it was generally introduced into Europe only about the middle of the 14th century.

The method of making gunpowder is nearly as follows: Take four ounces of refined salt-petre, one ounce of brimstone, and six drams of small-coal: reduce these ingredients to a fine powder, and continue beating them for some time in a stone mortar with a wooden pestle, wetting the mixture with a due proportion of water, so as to form the whole into an uniform paste: this will be reduced to grains, by passing it through a fine wire sieve; and, after being carefully dried, it constitutes the common gunpowder.—We do not, however, advise readers in general to make experiments fraught with such imminent danger.

The effects of gunpowder, in mines, &c. may be considerably increased, by leaving some space between the powder and the wadding. Hence, in loading a screw-barrel pistol, care should be taken that the cavity for the powder be entirely filled, so as to leave no space between it and the ball, because musquets, fowling pieces, &c. are very apt to burst, if the wadding be not rammed down close to the powder.

In Birch's *History of the Royal Society*, we are informed that Prince Rupert manufactured gunpowder of a force exceeding the best kind made at present, in the proportion of 21 to 2; and that such superior quality is to be ascribed chiefly to a peculiar method of purifying the nitre, and employing charcoal obtained from the wood of the alder buck-thorn.

Gun-shot *Wounds.* See Wounds.

GUTTA SERENA, or *Amaurosis*, signifies the loss of sight, without any other visible cause or defect in the eye; except that the pupil (or the round hole for admitting the rays of light) is generally deprived of its power of contraction.

Numerous are the causes from which this unfortunate blindness may arise; but the principal of them are nervous and paralytic affections. Violent contusions of the head; apoplectic fits; *hot* baths; suppression of catarrhs, or periodical evacuations; metallic cosmetics; drunkenness; sudden flashes of lightning; repulsion of cutaneous eruptions; long fasting; frequent exposure to the rays of the sun; violent exercise and passions, especially terror and anger; as well as purgatives, rheumatisms, sneezing; explosion of gums; copious blood-letting; vomiting; worms, &c. all may occasion *amaurosis*.

Among the remedies which have been found the most effectual, for removing this melancholy disease, are electricity; the cold bath; hot embrocations, or blisters containing antimonial tartar, applied to the spine; leeches to the eyes of plethoric patients; the magnet fastened to the nape of the neck, and a bag of iron-filings placed over the eyes; agitation of the frontal nerve; artificial ulcers; scarifications, or issues and blisters on the back part of the head, kept open for a considerable time; cupping; sinapisms,

pisms, &c. while the body should never be suffered to become costive. For this purpose, we preferably recommend small doses of tartarized kali with Peruvian bark, namely, one or two drams of the former, and one or two scruples of the latter, to be taken once a-day, or oftener, as occasion may require.—Mercurial remedies have also been used with great advantage; but they ought to be regularly prescribed.

There is another disease, called *cataract*, namely, a dimness or loss of sight from the interposition of an opaque film, either in the eye itself, or in the eye-lids. This malady generally takes place by imperceptible degrees; it is often consequent to inflammations of the eyes, and arises from the abuse of spirituous liquors, external injury, and mortification; acrid vapours, &c. In the commencement of this complaint, similar remedies to those mentioned for the cure of gutta serena, may be used with advantage; beside which, emollient cataplasms and fomentations are of service, to check the progress of the affection. If, however, it has continued for some time, the cataract must be couched, or extracted by the skilful hand of a surgeon; as there is no other prospect of removing it; though electricity and mercurial purgatives, together with a poultice of fresh hemlock constantly kept upon the eye, and a permanent blister on the neck, are said to have sometimes afforded relief.

Gut-tie. See Calf.

GUTTERS, in building, denote canals in the roofs of houses, for receiving and carrying off rain water. They are also formed in streets, for similar purposes.

Gutters in agriculture, may be so disposed as to communicate with a large pond, or reservoir, for containing a fresh supply of water for cattle.

In the 4th vol. of the "*Transactions of the Society for the Encouragement of Arts,*" &c. Mr. Harriot recommends the formation of gutters made of elm, 18 inches wide, 12 inches deep, and 50 feet in length, with proper lids at each end, to let the water in or out at pleasure. This drain ought to lie 3½ feet lower than the surface of the earth; for, in Mr. Harriot's opinion, nothing can be more absurd than the general mode of arranging square gutters; because there is no comparison in the discharge of water from a flat gutter, of the same number of cubic inches, with that of a square one.

GYPSUM, or Plaster-stone, a native combination of calcareous earth with vitriolic acid. It is more loose and friable than lime-stone, and does not effervesce with acids, either in a crude or calcined state. But, though easily reduced to powder in the fire, it is, according to Cronstedt, nearly as difficult of fusion as lime-stone.

There are various species of gypsum discovered in Saxony, Spain, Italy, and other parts of Europe; and substances of a gypsous nature also abound in several parts of this country. Those found in the counties of Derby and Nottingham, are so fine as to admit of being polished, and manufactured into vases, &c. in a manner similar to alabaster.

The chief use of gypsum, however, is as a material for small ornaments and figures, as well as moulds for casting wax-work, &c. But, within a few years, it has

been

been advantageously employed for fertilizing the soil; and various experiments have been made by different agriculturists, to ascertain its efficacy. From these, it appears to be a most valuable manure; and a correspondent in the 5th volume of the "*Letters of the Bath and West of England Society,*" states, that he covered a piece of grass-land two inches thick, with barn-manure; while, on another part of the same exhausted land, he scattered gypsum or plaster of Paris, in order to compare its effects with those of the dung. Both spots were mowed twice in the same year, and once in the succeeding: in every crop the land covered with gypsum was more productive.—The effects of the latter manure on cabbages and turnips were equally beneficial; and particularly uplands, which were completely exhausted, and abandoned on account of their sandy nature, have thus been rendered fertile. These experiments have been conducted on a very extensive plan in the United States of America, especially in Pennsylvania; where two crops of grass were annually cut from sandy heights, the first of which yielded upon an average two tons per acre, and the latter, one; nor has this produce decreased after a succession of six years. In the same State, an old wheat-field was manured with gypsum about ten days after the harvest; in the ensuing March it was sown with clover; and early in September more than two tons of rich clover were obtained from each acre. Nine additional bushels of corn per acre were, likewise, produced in that country by a similar treatment of the soil.

Although the numerous experiments made in Britain have not succeeded in every instance, yet the superiority of gypsum over every other manure, for chalky and dry calcareous lands, has been clearly evinced.

In the year 1791, Mr. ARTHUR YOUNG scattered on a field of good turnip loam with a gravelly bottom, at the rate of five bushels of gypsum per acre, part of which was afterwards sown with clover, and the rest with wheat. The ensuing summer was uncommonly dry; and, though both the wheat and clover were eventually burnt up, yet previous to the drought, the latter was not only considerably higher, but also thicker, of a deeper, and far more luxuriant colour, and of a broader leaf than any other clover that had not been thus manured. No alteration, however, was discernible in the wheat. Mr. YOUNG concludes his account ("*Annals of Agriculture,*" vol. 16) with observing, that neither a similar quantity of night-soil, pigeons' dung, peat-ashes, nor any other substance with which he is acquainted, would have had an equal effect.

In the 17th vol. of the work last quoted, there is an account extracted from a provincial paper, concerning the effects of gypsum; from which it appears that, if oats be immersed in water, drained, and then gradually mixed with plaster of Paris, till the former were sufficiently dry to be sown evenly, the produce of such prepared oats will be much finer, and far more luxuriant, than from unprepared seed. One bushel of gypsum only was mixed with eight of oats, from which were produced 122 bushels, while 96 only were obtained from an equal quantity without any previous preparation. The clear profit, therefore, was 26 bushels of fine oats, and, if the increased weight of 1¼lb. be allowed, it will amount to *thirty bushels and a half!*

Sainfoin, grass, and clover, seem to receive the greatest benefit from gypsum, which, for the purpose of manure, ought to be previously broken, either by the hand with hammers, or by mill-stones, and then sifted: in this pulverized state, it may be scattered on the land, at any season of the year, in the proportion of eight or nine bushels per acre. The best time, however, for strewing this dry manure, is previous to gentle showers, by the aid of which its efficacy will be considerably increased.

Mr. KIRWAN affirms, in his excellent "*Treatise on Manures*," that the gypsum successfully employed in agriculture is of a fibrous texture; and in his opinion clay-soils are more improved by it than the calcareous. This assertion appears to contradict the experience of those who have employed that substance on a large scale, and especially the American farmers.—We shall not attempt to reconcile these differences, because the same manure may be attended with opposite effects on soils variously mixed and combined. The proper season for scattering the plaster of Paris is, according to Mr. KIRWAN, in the month of February or March, when it should be strewed on grass-land, at the rate of eight bushels per acre; as a larger proportion would be detrimental to the soil. He farther observes, that the theory of the effects of gypsum is to be deduced from its uncommon *septic* property; because it accelerates putrefaction in a higher degree than any other substance. Hence it ought not to be ploughed in, but merely deposited on the surface of the land, in order that the old grass may be speedily converted into coal, to nourish the young vegetables.

Dr. DARWIN, however, questions these deductions concerning bodies promoting putrefaction; as the advancement of that process has, in general, been judged of simply by the exhaling odour; which is liable to be altered, or destroyed, by its union with many bodies, without otherwise affecting the tendency to dissolution.

For the prevention of fatal accidents from either swallowing, or inhaling, gypsous matter, we refer the reader to the article LIME, which requires similar precautions and antidotes.

GYPSY-WORT. See Water HOREHOUND.

H.

HADDOCK, or *Gadus eglesinus*, L. a species of fish which periodically frequents the Yorkshire coast, in large shoals, and commonly weighs from two to three pounds.

Large haddocks are in roe, from the middle of November to the end of January; but, in the succeeding three months, they are said to be out of season. In the month of May they recover their flavour, and continue to improve till January, when they are in the greatest perfection.

These fish grow to a considerable size, weighing sometimes 14 lb.; but in such case their flesh is coarse, and not proper for the table: hence those of an inferior bulk are more esteemed when their weight does not exceed 2 or 3 pounds.

HAIL, a meteor, which is usually defined to be frozen rain; though it widely differs from the latter, as hail-stones are not composed of single pieces of ice, but of several small globules condensed together.

Hail is one of those phenomena, of which naturalists have in vain endeavoured to give a satisfactory explanation. As far as the limits of our knowledge extend, hail is a meteor, that is never productive of any good effect. Both rain and dew invigorate the whole vegetable world; and the frost, by expanding the water contained in the earth, often pulverizes and renders the soil fertile; while the snow shelters the more tender plants from being injured by severe frost. Neither of these purposes is effected by hail, which is indeed attended with contrary effects: for, during the winter, it does not lie sufficiently close to the ground, to preserve vegetables from the nipping frosts; and, during the spring and summer seasons, its cold temperature not only chills and blasts, but its weight greatly injures the more delicate plants; frequently laying whole corn-fields level. But, though we cannot discover any ostensible use of hail, it is certain that the Creator has formed nothing, that is not in some degree subservient to the operations of Nature.

HAIR, small filaments, which issue from the pores of the skins of animals, and which serve them as a natural covering.

Hair is found on all parts of the human body, excepting on the palms of the hands, and the soles of the feet; but it grows to the greatest length on the head and chin.—It is subject to few diseases; the only affection that can in this country be strictly considered as a disease, is BALDNESS; for which we have pointed out the most proper remedies. Vol. i. p. 152.

Frequent cutting the hair is very beneficial to the ears, eyes, nay, to the whole body: and, if the head be washed or immersed daily in cold water, it will be found an excellent preventive of periodical head-achs.

Persons subject to defluxions of humours from the head, to weak eyes and similar complaints, will derive great benefit from shaving the head at certain intervals; as this is the most effectual mode of opening the pores and promoting perspiration. There is no danger of contracting *cold* from washing or exposing the head, after being rubbed dry, to the open air: and this futile objection should influence only the conduct of those who, from ignorance or prejudice, carry all their exhaled impurities on the surface of the skin, and especially on the head, for a succession of years. Thus, perhaps, arise many states of intellectual derangement, the source of which is seldom suspected. Besides, cleansing the head affords comfortable and pleasing sensations; and the more frequently the hair be cut, it will grow the more speedily; so that this simple expedient may, in some measure, serve as a substitute for a constant blister, or artificial issue.

There are, however, certain

cases, in which cutting off the hair is attended with dangerous effects, especially during a state of convalescence from acute diseases. In a periodical work lately published in France, two instances are related of women, in a very promising state of recovery from a putrid malignant fever, whose hair had been cut, and who both died shortly after this imprudent action. A third owed her preservation only to her youth, and the energy of her constitution.

The hair is, by all nations, considered as an ornament to the person, more than as a covering for the head, provided by the beneficent hand of Nature. Hence various pomatums, and other secret preparations, have been imposed upon the public, for the purpose of "making the hair grow long and thick." We are no advocates for contrivances, which to our certain knowledge are generally composed of noxious ingredients, such as the calces of lead and mercury. Those persons who cannot be dissuaded from the use of artificial means, may with safety employ a mixture consisting of equal parts of olive oil and spirits of rosemary, to which may be added a few drops of oil of nutmeg. If the hair be rubbed every night with a little of this liniment, and the proportion be very gradually increased, it will answer every purpose to be attained by those boasted preparations which are sold by empirics.

Another source of fraud is that of changing the colour of the hair to a darker shade: with this intention various liquid remedies are vended by perfumers, under different alluring appellations. These, however, being likewise prepared from lead, antimony, and other metallic solutions, no prudent person will be induced to purchase them. The only method that can be pursued with impunity, is to cut the hair close to the head, and to pass a leaden comb through it every morning and evening, by which simple practice the hair will assume a darker colour; the perspiration of the head will not be impeded, and, consequently, the health of the individual rather promoted than injured.

Hair constitutes a very considerable article of commerce, especially since the fashion of wearing wigs has prevailed among all ranks, and has lately been extended to both sexes. The hair of this, and other northern countries, is preferred to that of the southern climates of Italy, France, &c. The chief quality of hair consists in its being *well fed*, as it is termed by hair-dressers, so that it be neither too coarse nor too slender. Hence thick hair is less susceptible of the artificial curl, and is disposed to frizzle; but, if it be too delicate, it will retain the curl only for a short time. The length of good hair is usually estimated at 25 inches; and, in proportion as it is shorter, it becomes less valuable. There appears to be no stated price for this article; as, according to its quality, it is sold at from 5s. to 5l. per ounce: it pays, when imported, a duty of 2s. 4½d. per lb.—With respect to the various operations which hair undergoes previously to being manufactured into wigs, we trust the reader will excuse our silence.

The hair of beavers, hares, and other animals, is used in various manufactures, especially that of hats, of which they constitute the principal material.

If the refuse of the short hair of hides be scattered on arable land, and left there to putrify, it proves one of the most fertilizing and durable manures.

HAIR, *in farriery*, is commonly called the *coat*; and, with respect to horses, merits particular consideration. The hair growing on the fetlock, serves as a defence to the prominent part of it, when the animal is travelling on rough, stony roads, or in frosty weather. If the hair on the neck and more exposed parts be close and smooth, it may be concluded that the horse is in health.

To render the hair of this useful animal fine and glossy, it is necessary that he be kept *warm at heart*, as the least internal cold will render the hair rough; he should also be frequently sweated, in order to loosen the dust and filth, which render his coat foul; and while he is hot, all the white foam, sweat, &c. that rises on his skin, ought to be carefully scraped off. The smoothness of a horse's hair, it is said, may also be considerably promoted, by rubbing his own blood over him for two or three days after it has been drawn; he is then to be well curried and dressed, in consequence of which, his coat will become as soft and glossy as if it had been covered with a fine varnish.

The hair of a horse's mane and tail is apt to fall off, especially if they have been suddenly over-heated, so as to engender, what is called in the language of the stable, the *dry-mange*. A similar effect will follow, after he has been surfeited, so that the foul humours are repelled into those extremities of the body. To remedy such disgusting appearance, the horse's mane, &c. should be anointed with black soap, and the animal washed with a strong ley prepared of wood-ashes. If, nevertheless, a canker arise on the animal's tail, it will be requisite to apply diluted oil of vitriol, which will corrode, and prevent it from making farther progress.

Horse-hair likewise forms a considerable article of trade; it pays on importation a duty of about 11d. per lb. and is partly employed for weaving the covers of the seats of chairs, sofas, &c. but principally for the stuffing of bolsters and mattresses. For the last mentioned purposes, the hair is previously baked, and, in that state, forms one of the most elastic couches, which is incomparably superior to the softest, but enervating, feather-beds.

HAIR-GRASS, or *Aira*, L. a genus of perennial plants, comprising 24 species; of which 14 are indigenous; and of these the following deserve notice:

1. The *cespitosa*, or Turfy Hair-grass, which grows in moist meadows and woods; flowers from June to August. This plant is frequently found in tufts, and occasions irregularities in the surface of meadows. It produces an abundant quantity of leaves; and being the roughest and coarest of all the grasses in pasture and meadow-grounds, cattle seldom touch them, unless impelled by hunger. It would, therefore, amply repay the trouble of eradicating it, and substituting better grasses: for this purpose, the land should be first drained, and then the tufts of this noxious weed pared up and burnt. Its ashes are said to afford an ex-

cellent manure.—Cows, goats, and swine eat the turfy hair-grass, but it is refused by horses.

2. The *flexuosa*, Heath or Waved Mountain Hair-grass, growing on heaths, in woods, and barren pastures; and flowering from June to August.

3. The *caryophyllea*, or Silver Hair-grass, which is common in sandy pastures; and flowers in the month of July.

Mr. Stillingfleet, in his excellent *Tracts relating to Natural History*, recommends the culture of both these last species, as being particularly well adapted for sheep-walks: for he has observed them always to abound in those counties which are celebrated for delicious mutton.

4. The *aquatica*, or Water Hair-grass, is found generally on the edges of pools and standing waters; it flowers in the months of June and July.—This plant is a wholesome food for cattle, and deserves to be more generally known; as it contributes much to the sweetness of the Cottenham cheese, and to the fine flavour of Cambridge butter.

HAIR-POWDER is generally prepared from starch, which, after being thoroughly dried, is ground and passed through the finest sieves. In its pure state, it should be perfectly white, and possess no smell. But in order to conceal base adulterations, or to please the votaries of the *toilette*, perfumers study the art of communicating to it various artificial odours from sweet-scented flowers, such as violets, jessamines, &c.

Dr. Darwin observes, that *alum* is sometimes used in the manufacture of hair-powder; and we understand from creditable persons, that even *lime* is frequently mixed with fine flour: it is therefore not surprizing that so many persons who employ hair-dressers display bald heads, and are under the necessity of wearing wigs; but, if the latter were aware of the injury they inflict on themselves, by inhaling such pernicious substances, in consequence of which, many who exercise that trade, pine away of pulmonary complaints, they would never use any other but genuine powder. And though common flour is not in itself pernicious, when used as a substitute for hair-powder, yet by the mucilage it contains, the hair is apt to be caked together when the head is sensibly perspiring, or is accidentally wetted by a shower of rain; an effect which may be frequently noticed in a whole regiment of soldiers.—Hair-powder pays, on importation, the *prohibitory* duty of 5l. 16s. 2½d. per cwt.

There is a great variety of vegetables which may be usefully employed as substitutes for hair-powder, in the manufacture of which large quantities of grain are annually wasted. The principal of the former is, we believe, the Horse-Chesnut, of which the reader will find some account, vol. i. p. 512.—See also Starch.

HALTER-CAST, in farriery, is an excoriation of the pastern, occasioned by the halter being entangled about the leg, in consequence of the horse's endeavour to rub his neck with one of the hind feet.

For the cure of this affection, it is requisite to anoint the sore part every morning and evening with equal quantities of linseed oil and brandy, properly mixed.

HALTING, among farriers,

signifies an irregularity in the motion of a horse, arising from a lameness, or other injury, in the shoulder, leg, or foot, which induces him to spare that part, or exert it too timorously.

As an intimate acquaintance with this defect is of considerable importance to the farmer, we shall briefly state the principal circumstances connected with the subject.

If a horse *halts*, the lameness may be discovered either *before*, in which case the malady is seated in the shoulder, legs, or feet; or, *behind*, when it lies in the hip, ham, &c.

1. When the cause of the affection proceeds from the *shoulder*, the horse does not lift up his leg, but drags it on the ground, or casts one of them more than the other, and keeps the knee in a manner unbent. On turning short, he will evidently favour the lame leg.—Hence the injury must be either in the top of the shoulder-blade, called the *withers*, which is known by the animal *halting* most when a person is on his back; his frequent shrinking; and, if pressed with the hand about the top of the shoulder-blade, attempting to bite: or, the hurt may be at the lower end of the shoulder-blade; in which case he treads with *thick steps*, shrinks, and is ready to drop on being squeezed in that part.—When it arises from the elbow which joins the marrow-bone to the leg, the horse winces, and draws up his foot, on slightly pinching the part above-mentioned.

2. If the lameness be in the *legs* (in which case it is in the knee, or pastern joint), the horse refuses to bend either the one or the other, and walks stiffly on that leg; or, when it appears in the *shank*, it will be discovered by some splint, screw, windgall, or other visible malady.

3. If the defect be in the foot, it is either in the *coronet*, and proceeds from a strain: or it becomes evident by a hot and inflamed tumor. Or, if it be situated in the *heel*, it may have been occasioned by an over-reach, which is discernible by the eye, as well as by the animal's treading entirely on his toe. When a horse halts more on sloping than on plain ground, the mischief is seated between the *quarters*. This kind of limping is sometimes occasioned by being pricked with a nail in shoeing; in which case, the offensive nail may be distinguished by pinching the head of each together with the hoof.

Should a horse *halt behind*, from a disorder in the hip, he will walk side-long, and not follow so easily with that leg as the other; nor will he turn on the side affected, without favouring the leg. This cause of lameness is particularly discoverable when the animal, in walking on the side of a bank, lifts up the injured leg higher than the other. Like all injuries of the hip-joint, that last mentioned is most difficult to be cured; and, in every species of the affections before described, total abstinence from hard labour, proper feeding, and, according to circumstances, either moderate exercise or complete rest, are essential requisites to a speedy recovery.

HAM, the lower part of an animal's thigh, adjoining to the knee; or the angle in which the leg and thigh, when bent, incline to each other.

HAM, in Commerce, denotes the thigh of a hog or bear, dried, seasoned, and prepared so as to preserve it in a state possessing a pungent and agreeable flavour.

Hams may be cured, in order to resemble in taste those of *Westphalia*, by the following process: Cover a young ham of pork with dry salt, let it lie for 24 hours to drain off the blood, then wipe it perfectly dry, and take one pound of brown sugar, a quarter of a pound of salt-petre, half a pint of bay salt, and three pints of common salt; incorporate these ingredients in an iron pan over the fire, and stir them continually till they acquire a moderate degree of heat.—In this pickle the ham must be suffered to remain for three weeks, frequently turning it, when it should be suspended in a chimney for drying, by means of smoke from no other but a wood-fire.—See also vol. i. p. 146.

Smoked Hams are a very strong food, which is not easily digested. If eaten in proper time, and in small quantities, they may be a cordial to some vigorous stomachs, especially in the morning, as a substitute for the pernicious *hot* and *buttered rolls*; but boiling renders their digestion still more difficult.—See SMOKING.

Ham pays on importation, a duty of 2l 11s. 8½d. per cwt.

HAND, a part or limb of the human body, which forms the extremity of the arm.

The most common accidents to which the hand is liable, are *sprains* from violent exertion, and *chaps* from sudden changes of heat and cold.

When the hand has been sprained, Dr. LOBB recommends fomentations with vinegar for several minutes, and two hours after every application, the part affected should be wetted with rectified spirit of wine, and then gently rubbed.—We believe, however, that of all the emollient remedies, goose or duck's fat is productive of the best effects, if the hand or arm be kept at rest for some time in that posture, in which it was when the accident happened.—See farther, SPRAINS.

For the cure of *chapped hands*, there is no better and more simple remedy than honey-water, if suffered spontaneously to dry, when it forms a kind of varnish, which speedily allays the pain and heals the skin. For the prevention of this complaint, it will be useful to observe, that the hands should never be held to a fire after returning from the cold air; and, after every washing, they ought to be carefully wiped and dried.

Hanging: See SUSPENSION by the Cord.

HARE, the COMMON, or *Lepus timidus*, L. is naturally a timid animal, and extremely swift in motion when pursued by dogs.

Hares are dispersed over almost every climate, and, though hunted in all countries, their species does not apparently diminish in number. They breed in the first year, and the female generally produces four or five leverets, after a gestation of about thirty days. Unlike dogs, the eyes of these animals are open at their birth; and, after being suckled for about three weeks, they are abandoned to their own fate.

Hares are remarkably infested by fleas.—According to LINNÆUS, the Dalecarlians manufacture a species of cloth, or felt, from the fur of this creature, which, by attracting the insects, preserves the wearer from their troublesome attacks. Hare's wool forms an important article in the manufacture of hats; and pays, on importation, a duty of only 1s. 10d. per lb.; as sufficient quantities of it cannot be procured in Britain.

Hares are of a gentle disposition, susceptible of a kind of education, and, if taken very young, may easily be domesticated. They attain the age of about seven or eight years, and their proper food is grass, cabbages, and other plants. Sow-thistle, dandelion, and lettuce, are to them peculiarly agreeable.

These animals frequently inflict great injury to trees, by barking them. Beside the hints already given (p. 141), for the prevention of this mischief, we learn from M. de EHRENFELS, a German writer, that trees may be effectually secured from their depredations, by anointing the bark in autumn, several feet high, with hog's-lard, and sometimes also besmearing them with ox-gall.—Another remedy, which appears to be more efficacious, and salutary rather than hurtful to the vegetation of the tree, consists in scattering occasionally small quantities of soot round the stem: this expedient has for many years been successfully practised in Scotland.

In order to prevent hares from devouring the young cabbage or brocoli, and other succulent plants, it has been recommended to dip their *roots* in the following preparation, before they are transplanted: Take the parings of old cheese, soak them in water, and preserve it till spring: then stir into the liquor such a quantity of clay as will form a pulpy mass.—We have had no experience of this medication; though it is affirmed, that it not only secures the future plants from the attacks of hares, but its exhalations are so obnoxious to those depredators, that they will not frequent gardens where vegetables thus prepared are growing.

With regard to its physical properties, the flesh of hare is more palatable in winter; and those bred in elevated countries are most esteemed. Nor should this animal be chased till it drops; for thus its flesh is rendered less digestible, and less wholesome: in other respects, its qualities are similar to those of DEER.

HARE-BELL, or Hare-squill. See Wild HYACINTH.

HARE-STRONG. See Common or Sea SULPHUR-WORT.

HARROGATE-WATERS, are those chalybeate and sulphureous springs, which rise in the villages of High and Low Harrogate, in the county of York.

Formerly, the chalybeate water only was used internally, and the sulphureous spring was exclusively employed as an external remedy. At present, however, considerable quantities of the latter are drunk for various complaints.

The sulphureous water is obtained from four springs, that rise apparently from a large bog situated at a small distance from the wells; and which is composed of decayed vegetable matter, forming a black, half-fluid, fetid mass, four or five feet thick, and supported by a bed of clay and gravel.

When first drawn, the Harrogate water is transparent, and emits a few air-bubbles. It possesses a strongly fetid sulphureous smell, similar to that of bilge-water; and is of a bitter, nauseous, and strongly saline taste. After being exposed for several hours to the open air, it becomes turbid, assumes a greenish colour, loses its sulphureous smell, and deposits sulphur at the bottom and sides of the vessel.

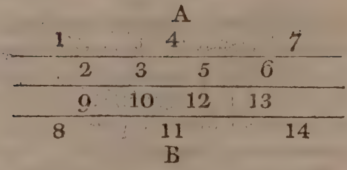
When first drunk, this water causes a slight giddiness and headach, but is speedily attended with a mild purgative effect, and its laxative properties continue, even after being kept for a moderate length of time.

Harrogate water is used in various disorders of the alimentary canal, and in those affections of the biliary system from which the former are generated. Its chief internal use, however, is in scrophulous and cutaneous disorders; though it is also of considerable service, when applied externally to leprous eruptions, and other obstinate diseases of the skin. It is likewise a safe, and often a powerful remedy for the piles, as well as against the round worm, and ascarides, if such a quantity be drunk as will prove a brisk purgative. In general, such draughts are taken as will produce a sensible effect on the bowels: for this purpose, three or four glasses, containing somewhat more than half a pint each, should be swallowed in the morning, at moderate intervals. The water ought to be used cold and fresh from the spring, if the stomach can support it. In order to correct the nauseous flavour, Dr. GARNETT judiciously advises patients to eat a small portion of sea-biscuit, or coarse bread, instead of taking aromatic seeds, sugar-comfits, &c. By the former expedient, the offensive taste will be speedily removed, and the stomach not be cloyed; a circumstance of the first consequence to invalids.

HARROW, an implement of agriculture, commonly used for the purpose of covering seed with earth. There is, however, another object of equal importance, to which it may be applied, namely, to pulverize the soil previously to its receiving the seed.

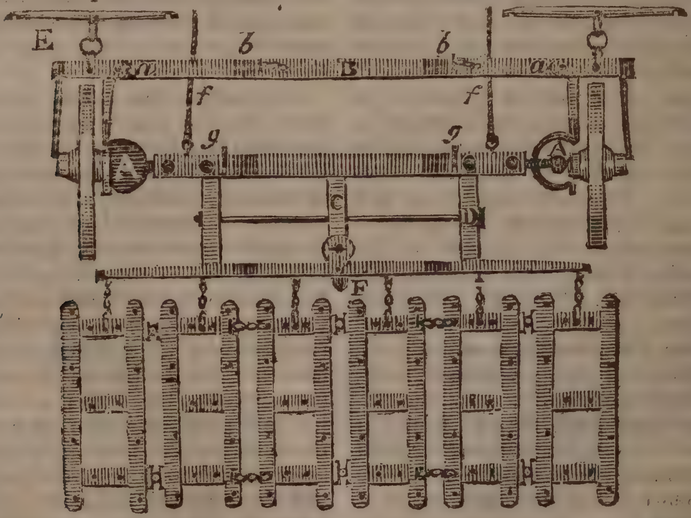
Common harrows are of different forms. The first we shall notice, has two bulls, four feet in length, and eighteen inches apart, each of which is furnished with four wooden teeth. The second has three bulls, provided with twelve similar teeth: a third has four bulls, and twenty teeth, composed generally of iron, which are ten, eleven, or twelve inches apart. The last mentioned implement is preferable to either of the former; as, on account of its iron teeth, it is better calculated for covering the seed; but it is still very imperfect, and the use of it attended with many inconveniencies. Hence different harrows have been invented at various periods, the principal of which we shall describe in the order of time.

The earliest that merits notice is the *Harrow-plough*, invented in the year 1763, by a Mr. WOOD, of Chelmsford, Essex: a full account of which appears in the 2d vol. of the *Museum Rusticum et Commerciale.* It consists of a common harrow-frame, 7 feet in length, and 4 in breadth, to which are fitted 14 iron shares, of the form of a heart, with a rounded point, being hollowed underneath, and convex on the upper surface: the edges of the rounded point, and two sides of these shares, are sharpened in the same manner as a common hoe; and the shares are disposed in the following order; the letter A representing the front, and B the back of the frame.



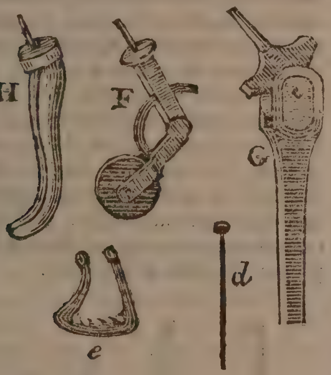
The design of this implement is to clear turnips from weeds, &c. Each share is about 14 inches distant, and, when the harrow-plough moves forward, the shares marked 1, 4, 7, are the first, each of which cuts the plants or weeds in its way. These are succeeded by others marked 2, 3, 5, and 6, which together form seven shares. The seven remaining behind are intended to complete the work commenced by the first row. Thus each share clears about 8 inches of land in width, and leaves the space of 6 inches untouched. This method of weeding turnips has been found much cheaper and more effectual than the common practice: for the shares cut deeper, and move the ground better than labourers will stir it with their hand-hoes. Besides, the harrow-plough, it is affirmed, will also bring land to an excellent state of improvement, after it has been three or four times ploughed.

In the year 1795, a harrow upon a new construction was invented by Mr. EDWARD KNIGHT, of Great Bardfield, Essex, for which the *Society for the Encouragement of Arts, &c.* in 1796, conferred on him a premium of 15 guineas. The purpose of his contrivance is to obviate the irregular motions, sudden and incessant checks, and various other inconveniencies attending the use of the common harrows. Hence Mr. KNIGHT has contrived two joints, A, A, in the axle-tree, one of which in the subjoined cut is covered, in the same manner as when the harrows are at work: the other is uncovered, to shew the construction of the joint. There are also two joints, *a*, *a*, in the front of the bar, by means of which, from



from the pliability, both of the tree and of the bar, the course of the wheels is facilitated; they are thus kept in their proper direction in the furrow; and as they occupy a very small space of ground, the implement is more easily and conveniently turned.

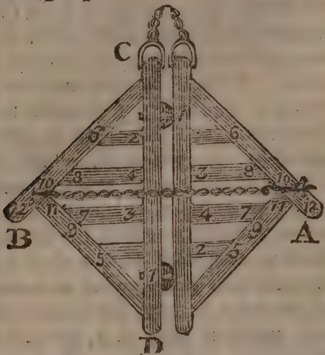
As the breadth of the furrows frequently varies, Mr. KNIGHT has, for contracting the harrow, so constructed his implement, that part of the bar B, which is fastened by two pins, *b*, *b*, can be taken off, as often as may be found necessary. Part of the axle-tree, and of the hind bar C, both of which are secured by the iron bolt D, may also be removed; the exterior parts, that still remain, may be joined and fastened by one of the two pins in the bar, and by a shorter bolt *d*, intended for the axle-tree and hind-bar:



If farmers work the harrow with two horses of unequal height, the horizontal direction or evenness of the joints is apt to be considerably changed. To remedy this inequality in the size of cattle, the inventor has added a *whipple-tree* E, that may be raised or lowered at pleasure, by means of notches, *e*, to which it is connected by a ring. In light, barley lands, when the harrow is adapted to the draught of one horse, by contracting it in the manner already directed, there are two strings conveyed by an equal number of rings from the axle-tree, through two loops *f*, *f*, beneath the front-bar. The hind-bar is supported by the wheel F, which is delineated both in the first cut, and in the second, on a larger scale: by the aid of this wheel, the implement is conveyed to the field on the axle-tree bar, serving as a substitute for a sledge. There are also two wooden pegs *g*, *g*, by which the harrows are secured, when turned upon the carriage.

In case it should be objected, that the harrow must be expensive on account of the iron, the inventor states, that an axle-tree and joints may be readily constructed of wood, upon the same principles as exhibited in the last cut, at the letter G; though he prefers iron to any other material; and, if the wheel under the hind-bars should not be adopted, Mr. KNIGHT has placed a slider, H, that works with a pin, and, when not in use, is fastened under the axle-tree. He observes, that his harrow may be easily raised or lowered, according to the surface of the land, by fixing an iron with notches (similar to those on the fore-bar, which support the whipple-trees), on the hind-bar, instead of the hooks; and by putting the latter on those irons. He computes the price of his harrows, if new iron be employed, at 4l. 13s.

In the "*Letters and Papers of the Bath and West of England Society*," is an account of an implement, invented by the Hon. Mr. R. SANDILANDS, and denominated by him a *Chain and Screw Harrow*, of which we have annexed the following representation:

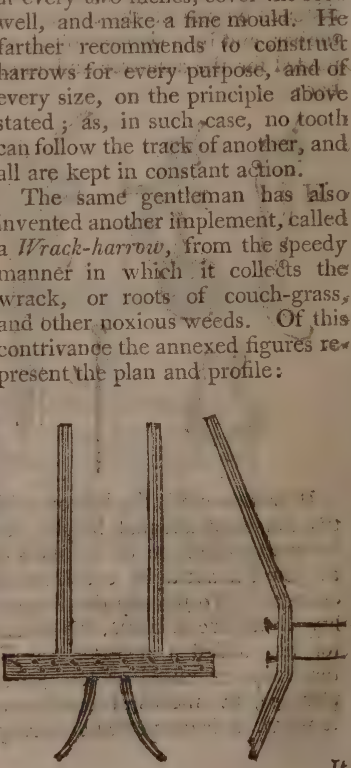


If the ridges be high, and require to be harrowed through their whole length, that object will be effected by Mr. Sandilands' implement; as by lengthening the chain (which is commanded by the screw), the harrow, when drawn along, will form an angle downwards, and thus pass over every part of the curve of the ridge in proportion to its extent; which, according to his statement, may be *nine* feet, the distance from A to B; whereas the whole extent from C to D, is said to be only about *five* feet and a half. When the crowns of the ridges have been sufficiently harrowed lengthways, the chain may be shortened by the screw, which forms an angle upwards: the harrow is then drawn by horses, one on each side of the furrow, which will be completely reduced as well as the sides of the ridges, if 18 feet in breadth.

If the harrow is to be drawn across even ground, or high ridges, in such cases, it may, by the aid of the screw, be made horizontal, so as to work in the manner of a [illegible]lid harrow without a joint. The teeth of Mr. Sandilands' implement are square, and fixed in the usual way, being nine or ten inches below the wood; and of such strength as the land may require. They cut or tear the ground regularly every four inches, without clogging, unless at the extreme angles, where the teeth are necessarily put somewhat closely together: they may, however, be cleared with the utmost facility, by raising them a little from the ground. The figures 1, 2, 3, 4, &c. point out where the twelve teeth on each side of the harrow are placed.

Mr. Sandilands observes, that where a strong brake-harrow is not necessary, by making the teeth shorter or lighter, 48 tines may be obtained, which will tear the ground at every two inches, cover the seed well, and make a fine mould. He farther recommends to construct harrows for every purpose, and of every size, on the principle above stated; as, in such case, no tooth can follow the track of another, and all are kept in constant action.

The same gentleman has also invented another implement, called a *Wrack-harrow*, from the speedy manner in which it collects the wrack, or roots of couch-grass, and other noxious weeds. Of this contrivance the annexed figures represent the plan and profile:



It is composed of a plank of timber, six feet long, nine inches broad, and two inches thick, in which are fixed two rows of teeth, viz. twelve in the front, and thirteen behind: each row is about four inches apart, and the teeth are five inches distant; so that they operate at the distance of 2½ inches from each other. They are in length about seven inches below the wood, three-quarters of an inch square, and pointed diamond-wise, so as only to catch whatever may be brought above ground by previous harrowing, without penetrating the soil. To the plank are joined shafts for a horse, and handles for a man to guide it, of such length and strength as may be deemed necessary.

This machine is used in the following manner: When all the weeds are brought to the surface, the wrack-harrow is drawn across the field; the person who holds the handles pressing a little on them, till the plank has passed over the first furrow, on which the harrow is suddenly lifted, without stopping the horse; thus, all the weeds collected by the harrow will fall into the furrow, whence they may be removed or burnt, at the option of the farmer. If, however, the horse be not steady, it will be requisite to employ a boy for the purpose of leading him; in order that the couch-grass, &c. may be properly eradicated.

A patent was granted in the year 1799, to Mr. WILLIAM LESTER, of Yardley-Hastings, Northampton, for his invention of a harrow, by which the inconveniencies attending the implements constructed on the common plan may be effectually obviated.

The patentee makes his harrows of various sizes, to be drawn by one, two, four, or six horses, so as to suit every kind of soil. The first size is six feet in width, and of equal length; the teeth are twelve inches distant in every direction, and there is an interval of one inch and a half between their tracks, in every line of draught. This size is more peculiarly adapted to harrowing-in every species of grain and seed, especially on *lay*, *flag*, or *whole-land*. The second size is 7½ feet wide, and 6 feet 9 inches in length; the teeth are 14 inches asunder in every direction, and an intermediate space of two inches occurs between their tracks, in each line of draught. This implement is particularly calculated for clearing foul land. The third size is 9 feet in length, by 7 feet 9 inches in breadth; the teeth are 16 inches apart in every direction, and a space of 2½ inches intervenes between the tracks in each line of draught. The last mentioned harrow is, in the opinion of the patentee, eminently adapted to the cultivation of foul land, especially for clearing *fen-fallows* of couch-grass.

The superiority of Mr. LESTER's patent-harrow is stated to consist in the impossibility of its clogging, or driving the soil together in heaps. Being divided into two parts, of equal length (which are drawn by two centers united in a third), it has a steady uniform motion, and is effectually prevented from diverging into any oblique direction. Another excellence in this contrivance is, its *couching* over both ridges and furrows, and its yielding to all the inequalities of the soil; besides, from the diagonal position of the bulls, and the irregular arrangement of the teeth, each tine is drawn in a different direction, so that no one tooth can follow another in the same track; whereas, in the common harrows, one half of the teeth run in the same course.

In the 9th volume of the *Letters and Papers of the Bath and West of England Society*, there is a description of a pair of harrows and of a drag, or heavy harrow, invented by Mr. H. WYNNE. His implements are constructed in such a manner, that each pin makes a separate track, and that the intervals between those tracks are all equal; so that the entire ground, over which the harrow passes at one time, will be marked with lines three inches apart. The pair of harrows is seven feet six inches broad; and the inventor asserts, that the same horses will, by means of it, work one fourth more ground, and perform such labour much better, than by any other harrow. Mr. WYNNE's implement is stated to possess this farther advantage, that when the pins or teeth sink into the earth, the posts being nearly parallel to the line of draught, admit all roots, stones, and other obstructions to pass freely between them, and also beneath the rails by which they are connected. And, as the hinge is within the tine, when the harrow is drawn up and down ridges, it accommodates itself to the shape of the ground; the joint rising when the harrow is on the top of a ridge, and sinking when it is in the furrow.

The drag, or heavy harrow, likewise invented by Mr. WYNNE, is constructed without a joint, and will work a piece of land six feet three inches in breadth, leaving intervals of five inches between the tracks. The principle is similar to that on which the implements just described are formed; and which, the inventor says, is applicable to harrows of any size; as the intervals between the tracks may be varied at pleasure, the regularity being still preserved.—The spikes or teeth here employed are made of square iron, pointed and bent forward diagonally; they are fixed in such a direction, that the line of the track may pass through their angles.

A patent was granted in May or June, 1801, to a Mr. WILDE, for a harrow on a new plan. His invention is intended to obviate the inconveniencies attending the common harrows: from the ingenuity and simplicity of its construction, it appears to merit attention. The set of harrows, when put together for work, consists of four, which are constructed in the usual manner, and with the usual number of tines. These are placed nearly parallel to each other, and are combined by means of three iron links, which are moveable where they are joined to the harrow: the centre link is fitted in an oblique direction, and is longer than the other two, which are set straight. All the links, however, are placed loosely, in order that the implement, when joined together, may have a little *play-room.* This ingenious harrow is fastened to the *bearing-bar*, to which the traces are affixed, by means of an iron pin that is attached to the chain-hook, passing through holes made at different distances in the bar, so as exactly to give the requisite direction to the harrow.—Thus, the equal course of the implement is secured; and the work is more uniformly performed, and with a greater degree of regularity.

Mr. WILDE makes harrows for

five-yard lands, exclusive of the furrows; but they may be adapted to any size required. The horses may likewise be set to draw abreast, or where the soil is very wet and heavy, to follow each other in the furrow, and thus to prevent the land from *poaching*. The patentee is of opinion, that a considerable saving might be made both in seed, and in the labour of horses, three of which are said to be fully sufficient, where other harrows require four. His implement may also be employed as a rake, or for any similar purpose.

From the great importance of harrows in tillage, we have been induced to extend this article to a considerable length.—Although we do not pretend to decide on the relative value and practical utility of the different inventions or improvements before specified, yet we should probably select the implements contrived by Mr. SANDILANDS, without prejudice, however, to the merits of the rest, which are doubtless calculated to be eminently useful in different soils and situations.

HARTFELL-WATER, is a vitriolated chalybeate spring, which arises from a lofty mountain of the same name, about five miles from Moffat, in the county of Annandale, Scotland.

The rock abounds with iron pyrites, aluminous schistus, and argillaceous stone, mixed with iron in different states. From the decomposition of these materials, the spring acquires its medicinal properties.

When first drawn from the spring, the Hartfell-water appears perfectly clear, but it deposits gradually part of its ferruginous ingredient, even when closely corked; it retains, nevertheless, a large quantity of iron in solution, and has a strong astringent taste, similar to that of ink. If it be preserved in close bottles, its properties remain undiminished for a considerable time.

This spring is said to be of considerable service in curing several obstinate disorders of the stomach and bowels; in dysenteric complaints, as well as in several periods of pulmonary consumption; and in all cases of general debility. Much benefit has likewise been derived from the use of this vitriolated mineral spring, when employed both internally, and as an external application, in old and languid ulcers.

The sensible effects of the Hartfell-water are sometimes giddiness and sickness, especially when a larger portion has been swallowed than the stomach can support. Hence, persons of delicate and irritable habits should at first take very small doses; for too large a draught is frequently rejected by the stomach, and occasions gripings in the intestines: hence it ought never to be employed as a direct purgative. An English pint is about the quantity which the generality of patients may safely consume in the course of a day, though its use may with advantage be continued for a considerable time. To render it, however, more suitable to weakly habits, it will be advisable to warm the water before it is drunk, as the difference of temperature will produce no material change in its medicinal properties.

HARTSHORN. See Buckthorn PLANTAIN.

HARTS' HORNS, are the horns of the common male red deer.—

The scrapings, or raspings, of this animal's horns are medicinal, and employed in decoctions, ptisans, or cooling drinks, &c.

Harts-horn jelly is remarkably nourishing, and sometimes given in cases of diarrhœa: a decoction of burnt harts-horn in water is, however, generally substituted for this purpose.

The coal of harts-horn, which is prepared by exposing it to a strong and long-continued fire, changes into a very white earth, called *calcined harts-horn*. It is employed medicinally as an absorbent, and likewise in dysenteries, which are supposed to arise from acrid and ill-digested matter.

The salt of harts-horn is sudorific, and has been successfully prescribed in fevers: it yields a very penetrating spirit, which is useful to persons of weak nerves, or subject to fainting fits; though the preparation generally used, is distilled from bones, after extracting the oil. The latter is more grateful to the stomach, retains its limpidity for a much longer period, and is consequently superior to that obtained from harts-horn. This valuable substitute, however, is frequently adulterated by means of quick-lime. In order to detect the fraud, let a small portion of strong spirit of wine be mixed with the suspected volatile spirit; and, if a white powder be separated, let it subside, till the fluid can be decanted. A little of the sediment is then to be poured into a spoon, and held near a fire, or over the flame of a candle: if the powder be completely dissipated, the spirit is not prepared with lime, and contains a due proportion of volatile salt; but, if any remain in the spoon after it has been exposed to a moderate heat, it may be concluded that quick-lime, and other pernicious ingredients, have been employed.

HARTS-TONGUE. See SPLEENWORT.

HASEL. See HAZEL-NUT TREE.

HAT, a covering for the head, which is generally made of a mixture of Spanish wool with that of hares, kids, rabbits, beaver, &c. Lately, feathers have been usefully employed in the manufacture of this article.

As it would be too tedious to detail the various processes the different materials undergo, before they are converted into *felt*, we shall content ourselves with observing, that the degree of fineness depends entirely on the greater or less quantity of hare's wool and beaver employed in its texture. The former is usually mixed with equal portions of the finest sheep or lambs' wool; but the beaver is generally confined to the facing of finer hats, into which it is worked superficially, and therefore seldom used for the body, or principal material of this article.

After the hat has been shaped and fashioned, it is dyed in a liquid prepared of logwood, and a mixture of green copperas and blue vitriol; when it is stiffened with common glue: the beer grounds (which are previously applied to the inside, to prevent the glue from penetrating through to the face) being perfectly dry. In the dyeing process, however, our hatters acknowledge their inferiority to those of France and Holland, which is imputed to the water on the Continent being kept for many months, nay, in some places, for years, before it is used.—Various other little operations are still required, in order to soften and give the hat its final shape, after which it is lined and trimmed for sale.

A patent was granted in January 1782, to Mr. ROBERT GOLDING, of Southwark, hat-dyer; for his method of dyeing, staining, and colouring beaver hats green, or any other colour.—The inventor directs the nap of the hat to be raised by means of a *card*, on the side intended to be dyed, and then boiled in alum and argol. A thin paste should be made of flour, or clay, which is spread over every part that is not to be dyed, and then closed; or the hat may be previously pasted, and instead of being boiled, it should be only simmered in the same liquor. As soon as the paste is spread, plates of copper or other metal, shaped like a common funnel, are fixed over the paste, to prevent the dye from penetrating through. In this state, the hat is immersed in the dye, till the colour be sufficiently fixed; when it is taken out, opened, and cleansed from the paste: but, if any colouring particles have penetrated through the felt, they may be removed by rubbing them with a small quantity of spirit of salt, aqua fortis, &c. The compounds employed in dyeing, are fustic, turmeric, ebony, saffron, alum, argol, indigo, and vitriol, with urine, or pearl-ash, at the option of the dyer; all of which are used together, or separately, according to the colour required.

Among the different patents granted to hatters, for discovering new materials in this manufacture, such as that of Mr. J. BURN, in 1792, for *mole-fur*; and another to Mr. J. TILSTONE, in 1794, for *kid-hair*; we shall only notice an invention of Mr. GEORGE DUNNAGE, who, in November 1794, obtained a patent for his *Water-proof Hats*, in imitation of beaver. The articles he employs are similar to those commonly used for the making of hats, with which he mixes Bergam, Piedmont, or Organzine silk. These are dressed and worked in a peculiar manner; though we understand that hats thus prepared become heavy and oppressive to the wearer, while they acquire an ugly colour.—The curious reader will find the patentee's specification inserted, at full length, in the 4th vol. of the *Repertory of Arts and Manufactures*. The same manufacturer procured another patent in November 1798, for a method of ventilating the crowns of hats. This invention consists in separating the top from the sides of the crown, so that the tip, or top-crown, may be either raised or let down at pleasure, in order to admit the external air, or to exclude it from circulating in the crown of the hat. The whole contrivance is effected by means of springs, sliders, sockets, grooves, loops, and cases, which are connected with the top and side-crown: thus the admission or exclusion of atmospheric air in front, behind, or on either side, may be regulated accordingly.—As this invention is ingenious, we refer the reader to the 10th vol. of the work last quoted, where he will find a minute account, illustrated by an engraving.

HATCHING, is the maturation of, or communicating life to, fecundated eggs, either by the incubation and warmth of the parent bird, or by artificial heat.

The art of hatching chickens by means of ovens, has been long practised in Egypt, where it is confined

fined to the knowledge of the inhabitants of a single village and its vicinity. This method being easily understood, we shall only observe, that each brood is supposed to consist of 30,000 chickens; the number of ovens amounts to 386, which are in constant employ for six months; and, as the eggs are completely hatched in three weeks, or about the same period as a hen continues to sit upon a brood, it has been calculated that the ovens of Egypt every year communicate life to at least 92,640,000 chickens!

A very ingenious, and useful method of hatching eggs, we conceive, is that invented by the celebrated naturalist REAUMUR, who reduced this art to fixed principles. The degree of heat necessary for the purpose, is nearly the same as that marked 36° on his own thermometer, which is equal to about 96° of FAHRENHEIT, as well as to the heat both of the skin of the hen and all other fowl.

M. REAUMUR employed stoves of any shape, which were heated by means of a baker's oven; or in a room warmed by an oven underneath: the eggs were here deposited, and occasionally shifted in a similar manner as the parent birds move them; in order that each egg might equally participate in the irregularities of the stove. The only important object is, to ascertain the precise degree of heat: with this design, he melted and poured into a phial two parts of butter and one of tallow. When the heat was of a proper temperature, the liquid grease resembled a thick syrup; if it was too great, the mixture flowed like oil, on holding the phial sideward; but, when the heat was too low, it remained fixed in a lump. Thus, by placing the phial into the stove, the proper degree of heat may be easily regulated. He also invented a kind of hollow covers, or low boxes, without bottoms, and lined with fur, which he called *artificial parents*. These not only shelter the chickens, when hatched, but also afford them a genial warmth, so that they fly under the boxes as readily as they resort to the protection of the wings of the hen. In a few days, they may be turned out into the open air, and committed to the care of capons, or even cocks, which may be taught to perform the maternal office, and watch them with as much solicitude as is evinced by hens.

HATHER. See HEATH.

HAULM, HALM, or HAWN, among farmers, signifies the stem or stalk of corn, pease, beans, &c. from the root to the ear.

The haulm of beans affords an excellent fodder for working-horses; that of pease, if saved in a favourable season, makes nourishing and wholesome food for horses, cattle, and sheep.—The stalks of potatoes are of considerable utility as a manure: if spread on coarse sour pasture, they will totally change its nature, and enhance the value of the land from ten to fifteen shillings per acre.

HAW, or HAUGH, in farriery, is a spongy excrescence in the inner corner of the eyes of horses, or other cattle, and which, if not timely removed, will occasion total blindness. It arises from gross humours, and is known by the watering of the eye, and the opening of the lower side.

To cure this excrescence, farriers direct the affected animal to be held fast by the head, and the upper eye-lid to be drawn back by means of a needle and strong thread; which, in cows or oxen, may be tied to one of the horns. The *haw* is then to be carefully cut out with a knife, after which the eye should be dressed, then washed with a sponge dipped in beer, or ale, and salt, in order to clease it properly, and absorb the blood. This operation, however, ought to be performed only by skilful farriers, as many valuable horses have been rendered irrecoverably blind by the deep cutting of ignorant pretenders. In such case, the wound must be dressed with honey of roses; and, if any fungous or spongy flesh should arise, it ought to be sprinkled with burnt alum, or to be touched with blue vitriol, that it might be completely eradicated. Where sheep are affected with the *haws*, the practice is to drop the juice of chamomile, or crows-foot, into the eye.

HAWK, the COMMON, or SPARROWHAWK, *Falco Nisus*, L. is a bold and spirited bird: it abounds in almost every part of Europe; and varieties of it are found dispersed over the whole earth.

The length of the male of these birds is twelve inches; that of the female fifteen; the former differs both in size and colour from the latter. The female builds her nest in hollow trees, high rocks, or lofty ruins, sometimes in the old nest of a crow, and generally lays four or five eggs, marked at the pointed end with reddish spots.

The Sparrowhawk is obedient and docile: by keeping him awake three or four days successively in a hoop, till he become almost delirious, he may afterwards be easily trained to hunt partridges and quails. In a wild state, however, these creatures commit great depredations on pigeons, poultry, rabbits, hares, &c. so that the following method of catching them will probably be acceptable to many readers.

A hawk-cage, made upon a plan similar to that of a goldfinch trap-cage, but larger, and baited with two house-sparrows, should be exposed in a fine clear morning, on a hedge, or some other open place, and left out till late in the evening. By this simple contrivance, those predatory birds might be easily taken; and either destroyed, or preserved for the purposes of hawking; an amusement that has lately been abandoned in this country, and therefore requires no description.

HAWKWEED, or *Hieracium*, L. a native genus of perennial plants, comprising forty-six species, the principal of which are:

1. The *Pilosella*, Mouse-ear Hawkweed, which grows in dry meadows, pastures, and on walls; its flowers possess the singular property of opening in the morning, and closing early in the afternoon: they blow from May to September. This species differs from other lactescent plants, being less bitter, and more astringent, on which account it was formerly esteemed in the cure of blood-spitting.—It is considered as noxious to sheep, which are not partial to it; and though eaten by goats, it is refused by horses and cows.

2. The *auricula*, Narrow-leaved Hawkweed, or Umbelled Mouse-ear, thrives on mountains, in the county of Westmorland, and flowers in the month of July. It deserves to be cultivated on the borders of gardens where bees are kept; for, according to BECHSTEIN, it furnishes them with an abundance of wax and honey.

HAWTHORN, or *Cratægus*, L. a genus of plants, consisting of twenty-five species, three of which are natives of Britain.

1. The *Aria (Pyrus Aria* of Dr. SMITH), White-beam Hawthorn, or Wild Pear-tree, which grows in woods and hedges, especially in mountainous situations with a calcareous soil, and flowers in the month of May. It delights in dry hills, and open exposures, thriving either in gravel or clay. It will bear lopping, and does not prevent grass from growing beneath it. The white-beam hawthorn is eaten by sheep and goats, which last animals devour it with avidity. Its fruit is red, and when mellowed by the autumnal frosts, furnishes a grateful repast;—a spirituous liquor may be obtained from it by distillation. This species seldom produces a good crop of fruit for two years in succession; but its barrenness is amply compensated by the utility of its hard, tough, and smooth wood; which is formed into axle-trees, wheels, walking-sticks, carpenter's and other tools: its seed should either be sown as soon as it becomes ripe, or preserved in damp sand.

2. The *Oxyacantha (Mespilus Oxyacantha* of Dr. SMITH) White-thorn, or May, which grows in hedges, woods, and old parks. This is a very valuable shrub, and, on account of the stiffness of its branches, the sharpness of its thorns, and its hardiness in enduring the severest winters without injury, it is universally preferred for making fences and hedges. The berries during winter afford food to various birds, but may be more usefully employed in fattening hogs: the wood is very tough, and, like the white-beam hawthorn, converted into axle-trees and handles for tools.

There are several varieties of this species, of which we shall mention only the celebrated GLASTONBURY THORN. It is in bloom twice in the year: the winter blossoms (about the size of a sixpence) appear about Christmas, and much earlier, if the winter be very severe. These, however, produce no fruit. This extraordinary thorn has been celebrated for its age, for nearly a whole century; the oldest inhabitants never having observed it in any other than its present state. The berries of this miraculous variety contain only one seed; and, when sown, produce plants which differ in no respect from the common hawthorn.

3. The *torminalis*, Wild Service-tree, Sorb, or Service Hawthorn, which grows in woods and hedges, and flowers in the month of May. Its dark yellow berries ripen in October, and may be eaten either raw or preserved in sugar. They also yield, on fermentation, a good vinegar, as well as an ardent spirit by distilling them: where they abound, hogs may be easily fattened.

HAY, signifies any kind of grass, that is cut and dried for fodder.

The time of mowing grass for hay, ought to be regulated according to its growth and maturity; for it is extremely detrimental to a crop, to cut it too early; because the sap has not sufficiently circulated through the whole blade of grass; so that the latter, when made into hay, shrinks and considerably diminishes in bulk. It is, however, equally prejudicial to the grass, if it be suffered to stand till it shed its seeds. When the tops of the grass appear brown, it will then be fit for being mowed.

The chief object in making hay, is to preserve the vegetable juices: with this design, different methods have been adopted, of which we shall notice the principal.

In the county of Middlesex, whence the London markets are chiefly supplied with hay, all the grass mowed on the first day, before nine o'clock in the morning, is *tedded*, that is, uniformly spread over the meadow, divided as much as possible, and well turned, before twelve o'clock, and perhaps a second time in the afternoon. It is then raked into wind-rows, and formed into small cocks.

On the second day, the grass mown the preceding day after nine o'clock, and what is cut on this day before that time, is tedded, and treated in the manner above described. Previously to turning the grass of the second day's work, the small cocks thrown up on the preceding day are well shaken out into *straddles*, or separate plats, five or six yards square. If the crop be so thin as to leave large spaces between the plats, they ought to be raked clean. The next business is, to turn the plats, and also the grass cut on the second day, which is generally done before one o'clock, in order that all the grass which is mowed may be drying while the people are at dinner. In the afternoon, the straddles or plats are raked into double wind-rows; the grass into single ones; and the hay is thrown up into *field-cocks* of a middling size, also called *bastard-cocks*; the grass is then cocked, as on the preceding day.

Similar operations are successively performed on the third day; the hay in bastard-cocks is again spread into straddles, and the whole is turned previously to the people going to dinner. Should the weather have proved fine and warm, the hay that was made into bastard-cocks on the second evening, will, in the afternoon of the third day, be fit to be *housed*. On the fourth day, the hay is put into stacks.—This method has, from experience, proved very successful, especially in favourable weather.

On the Duke of ARGYLE's estates in Scotland, the hay is dried on pins in barns; and, when thus made, it has been found to be remarkably green and sweet.

According to Dr. ANDERSON's plan, the grass is to be cut only when it is perfectly dry, without spreading it out into swaths, wind-rows, &c. or tedding it, as is the general practice. Immediately after it is mowed, it is thrown up into small and narrow cocks about three feet high; each cock is slightly thatched, by drawing a little hay from the bottom of the cock, which is laid on the top, with one of the ends downwards. Thus, the hay may with ease and expedition be rendered equally safe from rain and wind, unless a violent storm should occur immediately after the cocks are raised. And, if they be put up when the grass is perfectly dry, Dr. ANDERSON affirms that they "never sit so closely as to heat," though they become in the course of a day or two so firm as not to be liable to be overturned, unless by a hurricane.

In these cocks, the hay is suffered to remain for a week or a fortnight; till, upon inspection, it is judged that they will keep in tolerably large *tramp-cocks*; in which case two men, each of whom is provided with a pitch-fork, carry the small cocks between them successively to the place where the *tramp-cocks* are to be raised. The advantages attending this method are: 1. That the labour is considerably shortened; 2. That the hay continues almost as green as when it was first cut, and that it retains its natural juices in the greatest perfection; whereas, by spreading it out, tedding it in the sun, &c. it becomes bleached, its sap exhales, and it is frequently much damaged by the rain. Particular care, however, ought to be taken, that the grass be perfectly dry when first piled up into cocks: for, if it be in the least degree wet, it will speedily become mouldy, clog together so closely as to be impervious to the air, and never dry, unless it be spread out in the sun. To prevent such an accident, Dr. ANDERSON directs the cutting of the grass to be commenced during fine, settled weather in the morning, and not to suffer the haymakers to touch it, till the dew be evaporated.

In the 28th vol. of *Annals of Agriculture*, we meet with a communication from DAVID BARCLAY, Esq. of Walthamstow, Essex, who has employed Dr. ANDERSON's method of making hay with success; but, instead of conveying the hay by hand to the stack, he caused a cart rope to be fixed round the bottom of a large cock, and to be drawn by a horse to the stack, while a man fixes a pitch-fork in the opposite side, and thus pushes the cock.

Dr. DARWIN proposes a middle way to be adopted between the different methods practised in the North and South of Britain. If the swath of cut grass be turned over only once in the course of a day, for three or four days, the internal parts of it become in a manner dried in the shade; and, if it be afterwards spread over the ground only for a few hours in a fine day, he believes the hay would become sufficiently dry to be stacked. He strongly recommends the grass to be thrown into small cocks at night, especially if the weather be damp, to prevent it from being injured by the excrements and slime from the vast numbers of worms, which rise out of the ground during warm moist nights. For this reason, the hay-cocks ought to be made as high in proportion to their base as possible, that a less surface may be in contact with the ground, while the broader top is exposed to the action of the air, by which the exhalation of its moisture is accelerated, and the hay itself is secured from accidental showers.

In wet seasons, Dr. DARWIN thinks the best method is to turn the swaths every day, or every other day, or make them into small cocks; thus to secure the whole from the injuries of incessant rains; and also to prevent the parts next the ground, as well as in the middle, from fermenting and putrifying. When the weather becomes more favourable, the hay may be made into large cocks, so that the perflation of the atmosphere will not only cause its moisture to exhale the more quickly, but an incipient fermentation will discharge a portion of heat, and thus contribute to dry the hay, by increasing the evaporation: in a similar manner, the remarkable heat generated in hay-stacks, finished only one or two days, greatly contributes to dry the whole stack.

Hay constituting the chief food of horses and other cattle, especially during the winter, different contrivances have been suggested to prevent it from being injured by rain, while making. And here we cannot but recommend the practice of *tippling*, which we have already described in p. 12 of this volume; as, from its simplicity and facility, it is equally applicable to clover and other grasses.

In the 14th vol. of the *Transactions of the Society for the Encouragement of Arts*, &c. Mr. JOHN MIDDLETON, of Lambeth, gives an account of a machine to be used in the making of hay. It consists of a back and two sides, or gates, each of which is about seven feet in length. The frames, or exterior parts, are of oak or ash, that of the back being 4 inches by 4, while those of the wings are 3 inches by 3. Between all the frames are fixed deal planks 3 inches by $\frac{1}{2}$, and at the end of each wing, or gate, are chains, to which the horses are to be fastened by means of splinter-bars. Before this machine can be employed, the hay is to be put into rows; the animals being harnessed, and managed by persons mounted on them, they are slowly driven on, so that all the hay may be collected between the gates. When the machine is filled, and the load is to be drawn to a distant place, the horses must be kept as closely together as possible.

We conceive Mr. MIDDLETON's implement will be found useful during the ardent heat of summer, especially when there are few labourers, in dragging the hay together as soon as it is sufficiently made, and thus preventing it from being parched. In showery weather, it is said to be still more serviceable; as, in case of approaching rain, the grass may be collected immediately, formed into a stack, and sheltered from wet by a cloth, or by treading it closely together, leaving a ridge in the middle, and by raking it down on the outside. He observes, that during the wet summer of 1795, this machine was particularly convenient; and that, if the boys or drivers be steady, and the horses tractable, or accustomed to the work, ten acres of hay may be effectually secured in little more than one hour.

In the 2d vol. of the *Transactions* of the same Society, Mr. RICHARD TOFT, of Kentish Town, describes a contrivance for securing hay-ricks from rain, while they are raising; for which he was rewarded with a silver medal. It consists of 240 yards of coarse cloth, called *duck*, prepared with tar and oil; three scaffold-poles, two of which are upright, the third is thicker in the middle than at the ends, being intended for a ridge; two double blocks; four pedestals, and about one hundred weight of tarred rope: beside these articles, there is a reel, or windlass, together with pullies, and iron work, &c. the whole expence of which amounts to about 28l. The pedestals are to be placed four feet in the ground, for the reception of the poles. The width of the cloth is required to be greater than its length, as it is to be raised by the ridge-pole, for the admission of air: and as the stacks are generally wider in the middle than at the bottom, the cloth is divided into two parts, that it may be the more easily folded over the pole. When a rick a rick is advanced above the eaves, and begins to become narrow, Mr. Toft directs the cloth to be taken down, by unhooking one end of the ridge-pole, and letting it down by means of a rope; after which the other is to be unhooked, &c. in a similar manner. The cloth may be suffered to rest upon the sides of the rick, but, in case of high winds, it will be requisite to fasten it with ropes.

In erecting the stacks, great caution is necessary that the hay be not put together before it is perfectly dry; in which case it not unfrequently happens that whole stacks are suddenly reduced to ashes. To prevent such accidents, a chimney or funnel is usually made in the centre of the stack, but it then becomes necessary to form *culverts* beneath the stack, by digging three or four trenches; covering them with boards or sticks; and exposing their apertures in every direction to the wind, in order to ensure continual ventilation.

As the erecting of funnels in stacks is not universally adopted, it is of consequence to ascertain the degree of heat which the stacked hay has acquired, lest it should at any time take fire. One of the easiest methods is that pursued by Mr. Ducket, and which consists simply in thrusting a *scaffold-bolt*, or some long iron-bolt into the hay rick, and then introducing a gun, or ram-rod, furnished with a strong worm, and screwing out a sample, by which he not only discovers the heat, but also the colour of the hay; and if the stack require air, he perforates it in several parts with similar holes, which thus answer every purpose of a ventilating funnel.

In Lancashire, barns have, within these few years, been erected for the preservation of hay, whence they are denominated *hay-barns*. They are built upon pillars, and covered with slates. Sometimes they are provided with floors boarded with planks, loosely placed, perforated with holes, and lying hollow for a certain space above the ground, for the purpose of admitting a free circulation of air beneath. These buildings are cheap, useful, and very convenient in bad weather: they afford such advantages in the preservation of hay, as will in a short time amply repay the expence of erecting them.

Having already pointed out the necessity as well as the utility of giving salt to cattle, we shall here only remark, that the most intelligent farmers sprinkle the salt while the stack is raising, alternately between each layer of hay, in the proportion of 1 cwt. of salt to 7 or 8 tons of hay. Every species of cattle will prefer inferior food thus prepared, to the finest hay in its raw state: for the salt assimilating with the juices of the hay, prevents too great a fermentation, and imparts a superior flavour. Farther, the salting of hay-ricks effectually secures them from becoming over-heated, or mildewed; so that the hay may be put together, without the least danger of its taking fire, in a much greener state than would otherwise be safe.

An excellent apparatus for securing hay and corn-stacks, has been contrived by Sir Joseph Banks; but, as an adequate idea of it cannot be conveyed without the aid of an engraving, we refer the reader to the 10th vol. of *Annals of Agriculture*, where its description is illustrated by a plate.

A patent was granted in February, 1801, to Mr. WILLIAM LESTER, of Cotton End, Northamptonshire, for his improved engine for cutting hay, straw, tobacco, &c. of which we shall give a farther account under the head of STRAW-CUTTER.

HAY-WATER, or *Hay-tea.* See vol. i. p. 423.

HAYS, signify a particular kind of net, for taking rabbits, hares, &c.

As rabbits frequently straggle abroad at mid-day for fresh grass, two or three of these nets are directed to be pitched at the entrance of their burrows. The sportsman then goes round their haunts with a dog, and drives them into their burrows, where an assistant seizes them as they enter.

HAZEL-NUT TREE, or *Corylus*, L. a genus of plants consisting of four species: one of these is a native of Britain, namely, the *avellana*, or Common Hazel-nut tree. It grows in woods, copses, and hedges; flowers in March or April.

All the different species of the hazel are large, hardy, and deciduous shrubs; they have several varieties, valuable for their fruit, which, in a cultivated state, is known under the name of *Filberts.*

These shrubs prosper in almost any soil, or situation; and may be propagated either by layers, or by planting their nuts in February; for which purpose the latter should be preserved in sand, in a moist cellar, inaccessible to vermin; but they should not be secluded from the external air, for want of which they will become mouldy. When reared in coppices, this shrub produces abundance of underwood, that may be cut every 5th, 7th, or 8th year, according to the purpose for which it is designed.

The uses of this wood are various: it is employed for poles, hoops for barrels, spars, hurdles, handles for implements of husbandry, walking-sticks, fishing-rods, &c. Where beautiful specimens are required for veneering or staining, the roots of the hazel-nut tree are preferable to the branches. In Italy, the chips are used for fining turbid wines; and in countries where *yeast* is scarce, the twigs of this shrub, dried, and afterwards soaked in the fermenting liquor, serve as a substitute for that article in brewing. Painters and engravers prepare coals for drawing outlines, from the wood of this plant, by the following process: Pieces of dried hazel, about the thickness of a finger, and 4 or 5 inches in length, are put into a large pot filled with sand, and the top of which is closely covered with clay. In this manner they are placed in a potter's oven, or otherwise exposed to a sufficient degree of heat; and, on cooling, the sticks are found to be converted into charcoal, which draws freely, and is easily effaced with India-rubber.

According to EVELYN, no plant is better calculated for thickening copses than the hazel; with this view he recommends the following expeditious method: Take a pole of hazle (for which ash or poplar may be substituted) of 20 or 30 feet in length, the head of which is somewhat *lopped* into the ground; the pole should likewise be chopped near the soil, in order to make it yield: thus fastened to the earth with a hook or two, and covered with fresh mould sufficiently deep, it will produce an incalculable number

ber of suckers, speedily thicken, and furnish a fine coppice.

The kernels of the fruit of the hazel-nut tree, though difficult of digestion, have a mild, farinaceous, oily taste, which is agreeable to most palates; yet *filberts* are said to be more nourishing than nuts: both, however, operate as a cathartic, when chewed small and taken in considerable quantities; but produce constipations of the bowels, if swallowed in large pieces; and dysentery, if eaten unripe. A kind of chocolate has been prepared from this fruit, which has also occasionally been converted into bread. An expressed oil is obtained from the nuts, which is little inferior to that of almonds: it is often preferably used by painters, as it readily dries; and chemists employ it as the basis of fragrant oils artificially prepared, because it easily combines with, and retains, odours. An emulsion made of the kernels, and taken with good old mead, is recommended for inveterate dry coughs.—Squirrels and mice are excessively fond of the nuts; goats and horses eat the leaves, but they are refused by sheep and hogs.

HEAD, the uppermost or foremost part of the animal body.

As the foundation of many diseases is laid, by taking cold in this part of the frame, we shall offer a few hints relative to its covering.—For new-born children, an easy and moderately warm head-dress is fully sufficient during the first weeks of their existence; as superfluous ornaments only tend to encumber and to fatigue them. The infant's cap, however, ought not to be narrow, nor tied too closely, lest the head be compressed, the muscles of the ears crippled, and the sense of hearing impaired.

It is equally hurtful for children and adults to walk in the sun with the head uncovered, yet our cumbersome black hats, though sanctioned by custom and fashion, are generally too heavy for the hot days of summer; they ought to be manufactured of lighter materials, and either white, or dyed of some light colour, especially for soldiers, travellers, and persons labouring in the field. Such individuals should wear hats made of oil-cloth, supported by fine wires, or of straw, chips, &c.

In this temperate climate, youth may with safety be accustomed to go with their heads uncovered; but, in those countries where either of the two extremes of heat or cold prevail, the opposite practice must be adopted.

Many diseases, however, might be avoided, were the trite, but true maxim of "keeping the head cool," more strictly attended to. Hence the wearing of thick and warm night-caps, whether at night, or in the day time, cannot be too much reprobated; as those who indulge in this whimsical habit, render themselves continually liable to take cold from the slightest change in the atmosphere: thus baldness, violent head-achs, and not unfrequently a lethargic stupor, or insanity, are among the many fatal effects which sooner or later follow this imprudent custom.—See also HAIR.

HEAD-ACH, or *Cephalalgia*, a painful sensation in the head, produced by various causes, and attended with different effects, according to its various degrees, and the part of the head where it is situated.

Head-ach, in general, is only a symptom of disease, and frequently occasioned by effusions of blood on the brain, as also by ulcers, accretions, &c. on that sensible organ. Persons of a sedentary life, or those subject to costiveness or indigestion, are more peculiarly liable to the attacks of the head-ach. An acrimonious state of the fluids; the stone; catarrhs; contusions on the head; a diseased state of the teeth; piles; hysterics; strong odours of every kind; the fumes of tobacco; rheumatism; gout; scurvy; worms both in the intestines and in the head; too much hair; grief; and intoxication, are among the numerous causes of this affection, which is sometimes so violent as almost to deprive the unhappy sufferer of his senses.

Where the head-ach originates from an internal cause situated within the brain, it is seldom curable. In nervous affections, relief may sometimes be procured by venesection, cupping, or leeches; by sneezing remedies, blisters, issues, or other topical discharges near the head; by purgatives; or by determining the fluids to other parts. Frequent combing and cutting of the hair, as well as bathing the feet in tepid water, will likewise be found very serviceable.—A poultice of elder flowers applied to the part affected, has been sometimes attended with good effects, as also has the holding of a piece of hellebore in the ear.

According to Thunberg, Cajeput oil, applied to the head, will afford considerable relief. Similar success has attended the application of æther and spirits of hartshorn as a sternutatory, and as a local remedy. It is asserted, that the most acute and obstinate head-achs have been removed by the use of vervain, both internally in the form of a decoction, and also by suspending the herb round the neck. Strong coffee has likewise been of considerable service, especially to phlegmatic habits, and those whose digestion is impaired.

The diet of persons afflicted with the head-ach ought to consist of such emollient substances as will prevent costiveness; for instance, stewed prunes, apples, spinach, &c. The drink should be diluting, such as barley-water, or infusions of malt, &c. Their feet and legs should be kept warm, and the head shaved, frequently bathed with warm water and vinegar, retaining it as much as possible in an erect posture.

Head-wark. Seed Red Poppy.

HEALTH, is a proper disposition of the several constituent parts of the body, by which they are enabled to perform their respective functions without any impediment.

The continuance of health depends chiefly on what has been professionally called, the six *non-naturals*; namely, air; food; exercise; the passions; evacuation and retention; sleep and waking:—treating of these subjects in their alphabetical series, and the restoration of health being the object of medicine, we refer the reader in both respects to the different articles, according to the order in which they occur.

Moderation, however, in the strictest sense of the word, is equally essential to the preservation of health, as a pure air, and wholesome food. Cleanliness, too, ought by no means to be neglected; for an unclean person very seldom enjoys good health. Hence, frequent washing of the skin is of the first importance; and we are fully persuaded, that most of the diseases, with which the lower classes of people are affected, especially in crowded neighbourhoods, originate from the filthy state which is but too evident in many of their wretched habitations.

With respect to those persons who propose to reside in hot climates, we shall state only a few simple rules, by an attention to which their health may be effectually preserved.

1. Abstain from all excess in spirituous liquors.

2. Avoid with the utmost care the evening dews, or wetting of the feet on the approach of night; as fatal sore throats not unfrequently arise from this source. Should the feet, however, have been wetted by any accident, let the whole body be speedily immersed into cold water.

3. Bathe every morning in the sea, or, if possible, in sea-water; but, where that cannot be procured, dissolve an ounce of salt in a bason of water, and wash the skin with the solution, after which put on the clothes without drying the skin. This operation strengthens the muscular fibres, and covers the skin with a kind of saline crust, which, in the opinion of Dr. Hales, effectually prevents all febrile infections.—With these precautions, he asserts, a person of a sound constitution may enjoy as good a state of health in the hottest as in the most temperate climates.

HEARING, is one of the external senses, and expresses the act or faculty of perceiving sounds.

Animals possess this sense in a more acute degree than man; the owl and the hare enjoy the faculty of hearing in a pre-eminent degree: by means of it, the former perceives the slightest sounds, and is thus enabled to seize her prey, while the timid hare is cautioned against approaching danger. This very delicate sense is liable to be impaired by a variety of accidents; hence arises that unpleasant defect called Deafness, of the causes and cure of which we have already treated.

HEART, a hollow muscle of a conical form, situated at the bottom of the thorax or breast: its basis is turned towards the right, and its point towards the left side. The former, whence the great blood-vessels take their origin, is covered with fat, and has two hollow appendages, called *auricles*, from their resemblance to an ear. The whole consists of two cavities, which are separated from each other by a thick muscular septum: one of these is called the *right*, and the other the *left ventricle*.

The heart, which may be considered as the most powerful muscle in the animal body, serves to facilitate the motion or circulation of the blood, which is communicated to the different parts of the frame, by means of various arteries and veins. These, however, it is the province of anatomy to describe; and as that subject does not enter into our plan, we trust this brief explanation will suffice.

HEART-BURN, or *Cardialgia*, an uneasy sensation of heat in the stomach, which is frequently attended with nausea and sickness.

The heart-burn generally arises from a prevailing acidity, indigestion, the eating of tough fat meat, and unfermented mealy substances. Those persons who are subject to this affection, ought to drink no stale or acid liquors, and to abstain from flatulent food.

If indigestion, or debility of the stomach, be the cause, the patient may take infusions of Peruvian bark, valerian, or any other stomachic bitter. Moderate exercise in the open air will contribute to promote digestion, and consequently remove the complaint.

Should the heart-burn originate from acidity of the stomach, the general practice is to administer absorbent medicines, such as prepared chalk, crab's claws, calcined oyster-shells, &c. a tea-spoonful of either being given in a glass of peppermint-water, which frequently procures relief.

There are, however, many cases in which absorbents tend to aggravate rather than to cure this troublesome affection; namely, when it proceeds from an acrid and empyreumatic oil generated on the stomach. In such instances, a tea-spoonful of the powder of gum-arabic dissolved in half a tea-cupful of water, and repeating this dose three or four times, if necessary, has been attended with immediate success; and, where the gum cannot be procured, a few blanched sweet-almonds finely chewed, and swallowed, have often produced a similar effect.

If the heart-burn originate from flatulency, the remedies pointed out for that affection, may be here safely resorted to; such as infusions of anise-seeds, ginger, and other carminatives.

HEART's-EASE, or HERB TRINITY, *Viola tricolor*, L. an indigenous annual plant, growing in corn-fields, &c. It produces generally white and yellow blossoms, intermixed with purple, which flower from May to September. This plant has almost endless varieties, and, when reared in gardens, is known under the name of *Pansies*. It was formerly in great repute for epilepsies, asthmas, &c. At present, however, it is used only in the disorder peculiar to children, called *crusta lactea*, or a species of SCALD-HEAD affecting the face. A handful of the fresh, or half a dram of the dried leaves, is boiled in a pint of milk, and if continued to be drunk for some weeks, both in the morning and evening, it has invariably been attended with success.

HEAT, signifies either the peculiar sensation we feel on the approach of burning bodies, or the cause of that effect, which is, FIRE.

Heat is now universally considered as a *modification of a fluid*; but, after the various inquiries of the most able chemists, much remains to be done towards ascertaining all the phenomena of this subtle and invisible element. In this place, we shall only select a few principles, in some degree illustrative of its nature and properties: 1. Heat and cold mutually expel each other. 2. Heat is *visibly* occasioned by the concentration of the rays of the sun, and also of the electric fluid. As fire, therefore, is evidently the cause of heat, it follows that both the light of the sun and the electric fluid are *elementary fire*. 3. Heat expands bodies in every direction; hence the elementary fluid, when producing heat, acts from a centre towards a circumference; and, when it generates *cold*, moves in a contrary direction. 4. It is, therefore, impossible to calculate the precise quantity of heat which any substance contains. 5. Heat assists the progress of vegetation, but too intense a degree of it produces effects totally different. 6. When *latent* heat is transferred to external bodies, vapours become *condensed*, and in some cases return to their original state: in others, they are productive of light, and a vehement degree of sensible heat, whence the different phenomena of DISTILLATION, EVAPORATION, &c.

With respect to the purposes to which heat is applicable, such as the warming of apartments, &c. we refer the reader to the articles FIRE-PLACE, GRATES, HOT-HOUSES, &c.

HEATH, or *Erica*, L. a genus of plants comprising 100 species, five of which are natives of Britain. The principal of these is the *vulgaris*, Common Heath or Ling. It grows on heaths and in woods; flowers from June to August.

In the island of Islay, in the west of Scotland, a wholesome ale is prepared, by brewing one part of malt, and two parts of the young tops of heath, to which hops are occasionally added.

In England, the common heath is employed in making brooms and faggots, which last are used either as fuel in ovens, or for filling up drains before they are covered.—Horses, sheep, and goats, eat the tender shoots of heath.—The stalks and tops are of considerable service in tanning leather, especially for soles; and, if woollen cloth be boiled in alum-water, and afterwards in a strong decoction of the tops, it will acquire a fine orange colour.—Bees are very partial to the flowers of this species; but, where heath abounds, the honey acquires a reddish tint.

HEATH, the BERRY-BEARING, BLACK CROW-BERRIES, or CRAKE-BERRIES, *Empetrum nigrum*, L. an indigenous plant, growing on moist mountains and elevated heaths, in the driest and most barren lands, as well as in bogs and moorlands. It abounds in Derbyshire, Staffordshire, and the northern counties; flowers in the months of April and May. Its black berries are eaten by the Highlanders; but, if taken in large quantities, they occasion violent head-achs: hence they are more proper for grouse.—The plant is not relished by goats, and is totally refused by horses, cows, and sheep:—if boiled with alum, the berries impart a purplish dye.

HECTIC FEVER, a species of slow fever, returning daily, with paroxysms at noon, and in the evening; generally attended with profuse perspiration at night; and the urine depositing a sediment like brick-dust.

Causes: Persons of tender constitutions, and those who indulge in violent passions, especially grief, are chiefly liable to the attacks of hectic fevers.—Besides, luxurious living, abuse of wine, the drinking of impure water, the excessive use of perfumes, as well as the suppression of natural discharges, and an injudicious treatment of catarrhal, putrid, inflammatory and intermittent fevers, are among the numerous causes of this disorder.

Prognosis: Hectics arising in consequence of a favourable suppuration of a wound, or ulcer, are the least dangerous. But, where they are *confirmed*, it is in vain to attempt a radical cure, as medicine can only mitigate the symptoms, and protract a lingering existence. The changes of the seasons are particularly fatal to young hectic patients, who, if attacked in the spring, generally languish till the succeeding autumn; or, if they become subject to the disease during the summer solstice, they linger out a wretched existence, till about the same period arrives in the following year.

Method of treatment: As this fever arises from various causes, it must necessarily require different remedies. In general, however, the chief object to be attended to, is the mitigation of the symptoms, by preventing both costiveness and looseness; by procuring sleep, and checking the night-sweats. The use of Peruvian bark has been attended with considerable success; for it tends to stop the progress of gangrenes, and the suppurations become more favourable. Cauteries applied to the head; antiscorbutics; together with gelatinous, or mealy substances, and the moderate use of generous wine, may be safely administered. In the beginning of the disease, soft, stewed eggs, and raw oysters eaten in small portions, have often proved very beneficial.—Dr. HULME recommends the inspiration of fixed air, in hectic fevers accompanied with pulmonary complaints. Much, however, depends upon the diet, air, and exercise. The diet, indeed, ought to consist chiefly of milk and vegetables. Half a pint of either goats or asses milk, which last is less viscid than any other kind, should be drunk three or four times in the course of a day, and continued for weeks, and even months. Some authors preferably recommend butter-milk, which in their opinion is equal to that of asses; observing that many persons have recovered by the free use of it: nevertheless, it should be sparingly taken at first, and gradually increased till it become almost the only sustenance.

Persons who have been accustomed to animal food and strong liquors, must effect this change by imperceptible degrees; and, by persisting in the course above mentioned, they will in most cases recover, unless the fever have made such progress as to reduce the frame to a confirmed consumption.

In hectic illness, where all other remedies have failed, a journey to Bath is generally proposed by the languishing patient, or the disappointed physician; but, as Dr. HEBERDEN has judiciously observed, the fatigue and inconveniencies of travelling, to a dying person, are such as ought necessarily to preclude the attempt: besides, the Bath waters are peculiarly hurtful in this fever, which they always increase, and thus aggravate the sufferings, and accelerate the death of the exhausted traveller.—Whether the boasted virtues of the *digitalis*, or fox-glove, are such as have lately been promulgated with sanguine exultation by several writers, time and experience alone can decide.

HEDGE, in agriculture, a fence inclosing a field, or garden, &c. generally made by intertwining the branches of trees.

Hedges are usually divided into two classes: 1. Outward fences, planted either with hawthorn or black-thorn, of which we have already treated under the article FENCE; and, 2. Those intended for gardens, which are planted according to the fancy of the possessor, with holly, yew, or other evergreens.

In forming outside hedges, the plants ought to be as nearly as possible of the same size. The sets should be about one-third of an inch in diameter, freshly taken up, straight, smooth, and well rooted. The best season for planting them out, is late in the autumn; and the young hedge ought particularly to be attended to during the first two years; because, if it be then neglected, no future care can recover it. The top-shoots must not be shortened, but the sides regularly pruned for some years, while the inclosure is young; for, only by adhering to this practice, the hedge will attain a proper degree of closeness and strength.

The late Mr. BAKEWELL was remarkably curious in his fences: he used to plant one row at the distance of a foot from set to set; and, after making the ditch, to lay the earth dug out of it, so as to form a bank on the side opposite to the quick. In other parts of England, the bank is made on the side of the quick above it. The advantage of Mr. B.'s method is, that the plants grow only in the *surface-earth*, not secluded from the atmosphere; whereas, in the common practice, the best earth is generally loaded by a thick covering of mud taken from the ditch, and placed obliquely on the bank. There is, however, a considerable waste of land in the former method: for, after the whole was thus formed, he usually added a double post and rail; one on the outside of such bank, and the other on the outside of the quick.

Hedges designed for ornament in gardens, are sometimes planted with evergreens, among which the holly is preferable to any other; next in rank is the yew, but the dead colour of its leaves renders such hedges less agreeable. The laurel is another plant that may be employed as a fence for garden s; as it is one of the most beautiful evergreens; but it shoots forth with such luxuriance, that it is very difficult to confine it to any shape: its leaves, too, are very large, and, if cut through with the sheers, present a very disagreeable appearance: hence they ought to be pruned with a knife, and the shoots exactly cut down to each leaf.

In the 3d vol. of the *Transactions of the Society for the Encouragement of Arts*, &c. Mr. LEATHAM, of Barton, gives an account of his method of planting quickset hedges on dry, gravelly, or *thin* soils. He considers the causes which render such hedges very indifferent, to be—1. That they are set too low or flat on the surface, to allow the roots to strike deeply into the soil. 2. That, when planted higher, they are generally too near the slope of the bank, and thus cannot receive the benefit of the rain. To remedy these inconveniencies, two lines are marked out, 12 feet apart; the upper part of the soil is taken from three feet within each line, and thrown into the centre of the space, so as to form a flat bed, three feet in breadth, in the midst of which the quicks are planted; the remaining space of 18 inches on each side is filled up with the earth, gravel, or sand taken out of the ditches on both sides, by which means the bed is extended to five feet, allowing six inches for the slope of the bank. Quicks, thus planted, will find sufficient nourishment in the soil, before the tap-root reaches the barren gravelly bottom; and the earth thus placed, will retain moisture enough to nourish the plants; so that they will in a short time form an excellent fence, which, by elevating the bank on each side at pleasure, may be protected at a small expence from the ill effects of sharp winds, or the air of the sea. Mr. LEATHAM observes, that the space, on such low-priced ground, is but small; and, as a good, thriving fence is obtained, it amply compensates the expences. A hedge, constructed according to the dimensions above stated, cost him fifteen-pence per rod of seven yards in length.

In the 1st vol. of the *Letters and Papers of the Bath and West of England Society*, we meet with a communication, in which *elms* are recommended for fences. When elm-timber is felled in the spring, the chips made in trimming the trees are to be sown on a piece of newly-ploughed land, and harrowed in, as is practised with corn. Every chip, that has an eye or bud, will speedily shoot like the cuttings of potatoes; and, as such plants have no tap-roots, but strike their fibres horizontally in the richest part of the soil, they will be more vigorous, and may be more easily transplanted, than if they had been raised from seeds, or in any other manner. They possess this farther advantage, that five or six stems will generally rise from the same chip; and, after being cut down to within three inches of the ground, they will multiply their side-shoots in proportion, and form a thicker hedge, without running to naked wood, than by any other method hitherto practised: Lastly, if they be kept carefully clipped for the first three or four years, they are said to become almost impenetrable.

In the second volume of the same instructive work, we find another communication on the subject of hedges; and the great advantages that might be derived from them, by planting cyder-fruit-trees. If a judicious mixture of such trees were set in hedges, the profit they afford would amply compensate the expences incurred, without any loss of ground. And, as the best kinds of this fruit are so extremely sour at the proper season of gathering, that even hogs will scarcely touch them, depredations are not to be apprehended.

Having already treated on FENCES, we shall only add, that those of our readers, who wish to acquire a more complete information on the subject, may with advantage peruse the first and second volumes of Dr. ANDERSON's "*Essays on Agriculture*," in which it is fully discussed, and the plants best calculated for making hedges are judiciously pointed out.

HEDGE-HOG, the COMMON, or *Hystrix erinaceus*, L. is a quadruped, which is from nine to ten inches in length, the body is of an oblong form, entirely covered with sharp quills on its back, but with hair on the breast; the ears are broad, round, and short, and the eyes small and protuberant.

The females of these animals, after a gestation of seven weeks, produce four or five young ones, of a whitish colour, with only the points of the bristles appearing above the skin.

Hedge-hogs unnaturally devour their offspring, and all attempts hitherto made to domesticate them, have proved ineffectual. They frequent woods, live under the trunks of old trees, in the chinks of rocks, or under large stones. Being of a timid disposition, they proceed only at night in quest of food, which consists of fallen fruit, roots, leaves, insects, &c. It is, however, not founded on truth, that they extract the milk from the udders of cows; as the peculiar smallness of their mouth renders the act of sucking impracticable.—They may be advantageously kept in gardens, where they will be of considerable service, by devouring many noxious insects, especially moles, mice, and snails, which last they eat with great avidity.—The flesh of these creatures is eatable.

HEDGE-HYSSOP. See Hyssop-leaved LOOSE-STRIFE.

HEDGE-MUSTARD. See MUSTARD.

HELLEBORE, or *Helleborus*, L. a genus of plants consisting of five species, two of which are natives of Britain; the principal of these is the *fœtidus*, Fetid Hellebore, Bear's-foot, Ox-heel, or Setterwort. It grows in meadows, shady places, and hedges; producing green flowers, somewhat tinged with purple at the edges, which blow in the months of March and April.

In a recent state, this species has an extremely fetid smell, accompanied with a bitter taste, which is so remarkably acrid, as to excoriate the mouth and fauces. A decoction of it is, by country people, employed as a cathartic, for which purpose one or two drams are fully sufficient. The dried leaves of the fetid hellebore are sometimes given to children as a vermifuge; but as their operation is so violent, that a large dose might easily prove fatal, this virulent plant ought to be employed only by farriers.—Beside immediate vomiting, the most proper *antidotes* to every species of the hellebore, are mucilaginous drinks in very large quantities; such as the decoctions of oatmeal, pearl-barley, linseed, marsh-mallows, &c. or milk and water; after taking which, the poisonous matter will be most effectually counteracted by diluted vinegar, juice of lemons, or other vegetable acids.

HELME. See Sea-MATWEED.

HEMLOCK, or *Conium*, L. a genus of plants comprising five species; one of which is a native of Britain, namely, the *maculatum*, Common Hemlock; or Kex, a biennial plant, growing in hedges, orchards, rubbish, on cultivated ground and dunghills; it flowers in the months of June and July. Its stalk is more than a yard high, sometimes an inch thick, hollow, marked with many dark-red spots, and knotty; its umbels consist of numerous small white flowers, and the fruit resembles aniseed, but has an unpleasant taste. The whole plant is poisonous; though its leaves were formerly often employed in schirrous tumors of the breast, and cancers; in which painful disorder, though it may not in every case effect a cure, it is a very useful medicine, when duly prepared and administered.

As the Common Hemlock, however, is one of the most deleterious vegetables of this climate, we advise the reader to refrain from meddling with this precarious medicine, and to intrust its preparation to professional hands. If inadvertently taken, this species, as well as the two following kinds of the Hemlock, require similar antidotes and treatment with the Hellebore,

bore, of which we have treated in the preceding article.

HEMLOCK, the Lesser. See FOOL'S PARSLEY.

HEMLOCK, the WATER, *Phellandrium*, L. a genus of plants consisting of two species, one of which, the *aquaticum*, Water Hemlock, or Horse-bane, is a native of Britain. It grows in rivers, ditches, and pools; and flowers in the months of June and July. This species is eaten by horses, sheep, and goats, but swine do not relish it, and it is totally refused by cows. It is considered as a fatal poison to horses, which on eating it become paralytic: this affection is occasioned by an insect called *curculio paraplecticus*, which is generally found within its stems; the usual antidote is the dung of pigs, which ought to be given to the animal as early as possible.

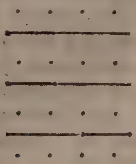
The leaves of the horse-bane are sometimes employed in discutient cataplasms; its seeds are recommended in intermittent fevers and pulmonary consumptions; but ought to be prescribed by the faculty.

HEMLOCK, the LONG-LEAVED WATER, or WATER COW-BANE, *Cicuta virosa*, L. is an indigenous perennial plant, growing on the sides of pools and rivers; flowering in the month of August.—It is likewise one of the most virulent vegetable poisons; its root is large, hollow, and contains a very acrid milky juice that soon changes to a saffron-colour, and has a nauseous taste, somewhat similar to that of parsnip: the stem attains a height of four feet.—Early in the spring, when it grows in the water, it is frequently eaten by cows, which are inevitably killed by it; but, as the summer advances, its scent becomes stronger, and they carefully avoid it. Yet, though it is thus fatal to cows, it is eaten with safety by horses, sheep, and goats, which last devour it with avidity.

HEMP, the COMMON, or *Cannabis sativa*, L. a valuable plant, which grows wild in the East Indies, and is cultivated to a very considerable extent in Britain, particularly in the counties of Sussex and Suffolk. It thrives most favourably on a sandy, moist loam, or on old meadows and low bottoms near rivers, and is propagated from seed, which is sown in the proportion of eleven pecks, or two bushels per acre, broad-cast; though a much smaller quantity will suffice, if it be drilled. The proper time of sowing hemp, is from the middle to the end of April, or even a month later; but the best crops are generally produced from the earlier seeds.

This useful plant requires no weeding: the male, or *fimble* hemp, is usually fit for pulling in the middle of July, or about nine weeks after it is sown. The female, termed *karle*, or seed-hemp, is seldom ripe till September, when it is *pulled*, tied into bundles, and set to dry: at the end of ten days they are loosened, and the heads or tops are held upon a hurdle by one person, while another, with a small threshing flail, beats out the seed.

The hemp is then prepared for the manufacturer, either by *grassing*, that is, lying on stubble or pasture ground, in order to be gradually *dew-ripened*; or, by *water-ratting*, for which process clay-pits are preferred to running-water. In these, the hemp is immersed in bundles, laid both directly, and across, thus,



for four or five days, according to the fineness of the weather. The next operation is that of *reeding*, namely, the separation of the bark from the *reed*, or woody part, which is effected either by pulling out the reed with the hand, or by drying, and breaking it by machinery, like flax. The hemp is then cleared of its mucilaginous matter, by pouring water through it, and squeezing out the liquid after every affusion, till it be completely divested of those particles.

The next operation is that of *breaking* it, which, in the county of Suffolk, is performed with the aid of certain machinery worked by the hand; when the hemp is beaten in mills; combed or dressed by drawing it through *heckles*, similar to the combs of wool-manufacturers; and spun into thread, whence it is made into twine, cordage, cloth, netting, &c.

Beside the strong cloth, and other articles made from it, hemp is of considerable utility for other purposes. The refuse, called *hemp-sheaves*, affords an excellent fuel; and the seeds yield by expression a pure oil, which is peculiarly adapted for burning in chambers, as it is perfectly limpid, and possesses no smell. Another valuable property of hemp is, that it effectually expels vermin from plantations of cabbages; for, if it be sown on the borders of fields, &c. planted with that vegetable, no caterpillars will infest it.

When fresh, hemp has a strong, narcotic smell: the water in which it has been soaked, is said to be in a high degree poisonous, and to produce fatal effects, immediately after drinking it. The seeds have an unctuous, sweetish taste; they may be triturated with water, or boiled in milk as an emulsion, which is occasionally taken as a domestic remedy in coughs, heat of urine, and similar complaints.

The important uses of hemp, and the superiority of that produced in this country, have justly rendered it an object of attention to Government. Accordingly, in the year 1783 a bounty of 3d. per stone was granted on all hemp raised in Britain, in order to encourage its growth: and, with the same patriotic view, heavy duties are imposed on that article, when imported from foreign countries. On the other hand, its exportation, both from Britain and Ireland, is duty-free.—The prices of hemp-linen, vary from one to six shillings and upwards per yard, in proportion to its coarser or finer texture.

There is another species of hemp, called *Chinese Hemp (Crotolaria juncea)*, which was introduced into England from India, in the year 1783, when various experiments were made with little success; though they fully proved that the plant will perfectly succeed in this climate. The most remarkable of the statements which have been published, is that communicated by the Rev. Dr. HINTON, of Northwald, near Brandon, Suffolk; on whom the "Society for the Encouragement of Arts," &c. in 1788, conferred the silver medal. This gentleman received some seeds from the Secretary of the Society, in 1786, which were sown on the 17th day of May, and the plants appeared on the 6th day of June. They were few, and sickly; and, notwithstanding several favourable showers, they continued to languish so much, that the experiment was entirely abandoned, and buckwheat was harrowed into the ground for a fallow-crop. In the beginning of October, however, the persons employed in cutting the buckwheat, discovered some seed in the heads of a few straggling hemp-plants, which had been suffered to grow among the crop; and which, after being carefully threshed, produced three pints of tolerably good seeds. On the 10th of May, 1787, they were sown on a small piece of good soil: in the course of nine days the young plants came up, and were suffered to grow till August, when they were pulled. The produce of pure hemp weighed at the rate of 95 stone 7 pounds and 12 ounces per acre, beside three bushels, two pecks, and half a pint of seeds that were saved; which is upwards of one-third more than the best crops of English hemp have ever been known to yield.

In the Eastern climates, hemp-leaves are used like opium, and possess similar intoxicating properties. The Russians and Poles, even of the higher classes, bruise or roast the seeds, mix them with salt, and eat them on bread.—Birds, kept in cages, are likewise fond of this oily seed; but they should not be indulged in its constant use, which is apt to render them prematurely old, blind, and at length consumptive.

Hemp being an article of extensive utility, various vegetables have been discovered, which may serve as substitutes. Among these are the Canada Golden-rod, or *Solidago Canadensis*, a perennial plant, that might be easily cultivated in Britain: its stalks are numerous, straight, and grow above five feet in height; they afford very strong fibres, if treated in the same manner as hemp. The sun-flower, or *Helianthus*, L. also affords single filaments or fibres, which are said to be as thick, and in all respects as strong, as small pack-thread.—See also NETTLE.

HEN, the female of the COCK *(Phasianus Gallus)*, an useful domestic bird which lays eggs, and produces one, and sometimes two broods of chickens in one year.

If well fed, and allowed to roam in a farm-yard, a good hen will deposit, in the course of twelve months, above 200 eggs. She prepares her nest without any care, either among bushes, or by scratching a hole in the ground; the time of hatching is preceded by a clucking noise, and the animal's discontinuing to lay eggs. Ten or twelve chickens being the greatest number that a good hen can rear and clutch at a time, various methods have been devised for obtaining young broods by artificial means, of which we have already treated under the article HATCHING.

Capons may easily be taught to clutch a fresh brood of chickens: First, the fowl is made so tame, as to feed from the hand; on the approach of the evening, the feathers are plucked off his breast; the bare skin is rubbed with nettles; and the chickens are then placed beneath him. This expedient is repeated two or three nights in succession, till the animal conceives an affection for the young birds thus committed to his charge: when one brood is grown up, another nearly hatched may be placed under him, in the manner above directed; and he will treat them with the same tenderness as the real parent.

HEN-BANE, or *Hyoscyamus*, L. a genus of plants comprising nine species, one of which is a native of Britain, namely, the *niger*, or Common Hen-bane. It abounds in villages, road-sides, and among rubbish; and flowers in the month of July. Neither horses, cows, swine, nor sheep, will touch this plant, though the animals last mentioned are supposed to eat it when young:—it is not relished by goats.

The seeds, leaves, and roots of the common hen-bane, taken internally, are reputed to be poisonous; and numerous instances have been recorded of their virulent effects. The general consequences of eating them are, convulsions, madness, and death; though Dr. SMITH states that he has eaten the *seeds* with impunity. The leaves, if scattered about a house, are said to drive away mice and rats: when bruised, they emit an odour resembling that of tobacco, and are so powerfully narcotic, that their exhalation occasions the head-ach and giddiness. The whole plant is fatal to poultry; it intoxicates hogs; but cows, horses, dogs, and goats, are able to bear a tolerable portion before they are affected.—In superstitious ages, the famous *sorcerer's ointment* was prepared from the leaves of the hen-bane, which produced a kind of delirious trance, or furious inspiration, on those who were anointed with this poisonous salve. Malignant persons, even in modern times, appear to be well acquainted with the properties and effects of the hen-bane: and the iniquities lately practised in a village near Newport, Salop, with a preparation of this powerful plant, almost exceed belief; especially as they were directed by one branch of a numerous family against another, not even excepting infants. When suspicions arose against those miscreants who were guilty of secretly mixing this baneful vegetable with ale and beer, they had the inhuman audacity to introduce the poison between the soles of the shoes; and after these were secured, between the seams of shirts that were suspended on the hedge.—We have mentioned these flagrant instances of depravity, in order to caution the credulous reader, and to shew that the extraordinary effects of this poisonous application arise from natural causes, and ought not to be ascribed to witchcraft, as was unfortunately the case in Shropshire, till the whole mystery was satisfactorily explained. The writer of this article, having contributed to detect the delusion, thinks it his duty to warn the public against certain grave and whimsical matrons, as well as old men lurking about country places, who, under the pretence of fortune-telling, and amusing the harmless listeners with spell-craft, cunningly enter into the secret history of different families, avail themselves of the most powerful herbs, and thus become subservient to the most nefarious purposes.

Notwithstanding these virulent properties, the hen-bane has lately been employed with considerable success in the most obstinate diseases, such as epilepsy, internal spasms, madness and melancholy; though we trust that no circumspect person will ever resort to its use, without consulting a medical friend. —If, however, any small portion of the leaves should have been accidentally swallowed, brisk emetics ought to be instantly taken; and, after discharging the contents of the stomach, it will be necessary to administer emollient and oily clysters, to repeat them as often as they are ejected, and to drink as large portions of vinegar or juice of lemons diluted with water, as the stomach is able to support.

In recent cases, where the poisonous ointment of hen-bane has been absorbed by the skin, mild sudorifics, joined with mercurial frictions, will then be very proper; in order to excite a slight salivation, and expel the virus; but, if some time after the accident has elapsed, and the patient become delirious, paralytic, consumptive, or blind, recourse must be had to professional advice.

HEN-BIT. See Fetid HOREHOUND.

HEN-HARRIER, DOVE-COLOURED FALCON, or BLUE HAWK, *Falco Cyaneus*, L. a native bird, found chiefly in the northern parts of Britain. It is about 18 inches in length; the female breeds annually on the Cheviot Hills, and other precipices in that neighbourhood; and makes her nest on the ground, where she deposits four eggs.

The hen-harrier flies low, skimming along the surface of the earth in search of its prey, consisting of lizards, reptiles, and birds, especially poultry; among which it commits great depredations.

HEN-MOULD-SOIL, in agriculture, a term used in some parts of England to denote the black, mouldering, hollow, spongy earth, which is usually found at the bottoms of hills. It is better calculated for grazing, than for the culture of grain; because it does not adhere sufficiently close to the corn to keep the stalks firm, while growing; or, if it appear to thrive, the growth is generally coarse, and yields abundance of straw, but little in the ear. This soil possesses too much moisture, arising from a bed of stiff clay, which prevents the discharge of the water into the lower strata, so that the crop becomes uncommonly rank.

In other parts of Britain, the appellation of *hen-mould* is given to a black, compact earth, streaked with white mould. This soil is very rich and fertile, producing the finest wheat.

HENTINGS, a term used by farmers to express a particular method of sowing grain before the plough, so that the seed is cast in a straight line, which is followed by the plough, and thus completely covered. This method of sowing is supposed to save a considerable quantity of grain, as well as to lessen expence; because a dexterous lad is fully competent thus to scatter the seed with the same regularity as the most skilful husbandman.

Hepar Sulphuris. See Liver of SULPHUR.

HEPATIC ALOE, the inspissated juice of the common aloe, a native of Barbadoes, and other West India Islands. Its smell is much stronger, and more disagreeable, than the Socotrine aloes; the taste is uncommonly bitter and nauseous. The best hepatic aloe comes from the island of Barbadoes, in large gourd-shells; an inferior sort, which is in general soft and clammy, is imported in casks. For an account of its medicinal properties,

ties, we refer the reader to p. 34 of our first volume.

HEP-TREE. See DOG-ROSE.

HERB, a name given to all plants, the stalks or stems of which perish every year, after their seeds have attained to maturity.

Herbs are usually divided into two classes: 1. Those, the roots of which decay together with the stem; and 2. Those, whose roots vegetate in the ground for several years.

The former class is subdivided into 1. *Annuals*, or those plants which arrive at maturity the first year, and entirely perish, immediately after they have shed their seeds; such are wheat, rye, barley, &c. 2. *Biennials*; and 3. *Triennials*; namely, such as yield fruits and flowers the second or third year, and then decay: of this nature is the Garden Angelica, and some other plants.

These herbs which do not decay after they have shed their seeds, belong to the latter class, and are called *perennials*; some of them lose their verdure, and continue bare during part of the year, such as colt's-foot, &c. while others retain their leaves the whole year, whence they are called *evergreens*; such are the holly, fir, &c.

Herbaceous Plants are such as are furnished with succulent stems, or stalks, creeping along the ground every year. They are divided into similar classes with herbs, and those which merit more particular notice, are treated of in their alphabetical series.

HERBAL (*Herbarium*), generally speaking, signifies a book, containing a methodical arrangement of the classes, genera, species, and varieties of plants, together with an account of their properties. It is also applied to a *hortus siccus*, or dry garden; an appellation given to a collection of specimens of plants carefully dried and preserved.

Among the different methods adopted by botanists, for obtaining a *hortus siccus*, the following appear to be the most practicable:

1. Lay the plants flat between papers; then place them between two smooth plates of iron screwed together at the corners: in this state they are to be committed to a baker's oven for two hours. After being taken out, they must be rubbed over with a mixture consisting of equal parts of brandy and aqua-fortis, then pasted down on paper with a solution of gum-tragacanth in water, after which they are to be laid in a book, where they will adhere, and retain their original freshness.—Although this process was suggested by Sir R. SOUTHWELL, in the 237th Number of the *Philosophical Transactions of the Royal Society*, yet the following method is more simple:

2. Flatten the plant, by passing a common smoothing iron over the papers between which it is placed; and dry it slowly in a sand-heat. For this purpose, the cold sand ought to be spread evenly, the smoothened plant laid gently on it, and sand sifted over so as to form a thick bed; the fire is then to be kindled, and the whole process carefully watched, till the plant is gradually and perfectly dried.—Thus, the colour of the tenderest herb may be preserved, and the most delicate flowers retain all their pristine beauty.

3. Another, and far more complete method, was suggested by the ingenious Mr. WHATELY; and bears a slight resemblance to that

last specified. He directs those who intend to follow his plan, previously to procure—1. A strong oak-box of the same size and shape as those employed for packing up tin plates: 2. A quantity of fine sifted sand, sufficient to fill the box: 3. A considerable number of pieces of pliant paper, from one to four inches square; and, 4. Some small flat leaden weights, and a few small, bound books.

He then directs the specimen of the plant intended for the herbal to be gathered, when dry and in full bloom, with all its parts as perfect as possible, and conveyed home in a tin box, well secluded from the air. The plant is first to be cleared from the soil as well as the decayed leaves, and then laid on the inside of one of the leaves of a sheet of common cap-paper. The upper leaves and flowers are next to be covered, when expanded, by pieces of the prepared paper, and one or two of the leaden weights placed on them. The remainder of the plant is now to be treated in a similar manner.

The weights ought next to be gently removed, and the other leaf of the sheet of paper folded over the opposite one, so as to contain the loose pieces of paper and plants between them. A book or two is now to be applied to the outside of the paper, till the intended number of plants is thus prepared; when a box is to be filled with sand to the depth of an inch, one of the plants put in, and covered with sand sufficient to prevent the form of the plant from varying. The other plants may then be placed in succession, and likewise covered with a layer of sand, one inch thick between each; after which the whole is to be gently pressed down in a greater or less degree, according to the tenderness or firmness of the plants.

The box is next to be carefully placed before a fire, one side being occasionally a little raised, as may be most convenient; the sides being alternately presented to the fire, two or three times in the day; or, the whole may be put into an oven gently heated. In the course of two or three days, the plants will be perfectly dry, when the sand ought to be taken out, and put into another box: the plants should likewise be removed to a sheet of writing paper.

This method of preserving plants, Mr. WHATELY states to be preferable to every other, as both the flowers and leaves, if kept loosely within the paper, in a dry room, without being exposed to the air, will retain their beauty for several years. It will, however, be necessary to inspect them once in the course of a year, for the purpose of destroying any small insects, that may accidentally breed among the plants.

HERB-BENNET. See Common AVENS.

HERB-CHRISTOPHER. See CHRISTOPHER, the Herb.

HERB-GERARD. See GOUT-WEED.

HERB-PARIS, or TRUE-LOVE, ONE-BERRY, or FOUR-LEAVED TRUE-LOVE, *Paris quadrifolia*, L. an indigenous plant, growing in woods and shady places; and flowering in the month of May or June.

The dark, brown berries of this plant, possess a narcotic smell, and are fatal to poultry. If inadvertently eaten by children or adults, they occasion vomiting and spasms in the stomach. The expressed juice of the berries, however, is said to be useful in inflammations of the eyes; and both the leaves and berries possess similar properties with opium.—According to LINNÆUS, the root of the Herb-Paris may be employed as a substitute for Ipecacuanha; for it excites vomiting, if given in a double proportion. — BÖHMER remarks, that the dried leaves impart a fine yellow colour to yarn or linen-cloth, which has been prepared in alum-water.

HERB-ROBERT, or FETID CRANES-BILL, *Geranium Robertianum*, L. an indigenous annual plant, growing on walls, hedges, rubbish, and stony places; flowering from May to October. This herb is in great repute among many farmers, for its efficacy against the staling of blood, and the bloody flux in cattle; in which cases it is said to be preferable to most of the remedies used on such occasions.

In Germany, the Herb-Robert is employed in the process of tanning; and DAMBOURNEY obtained from this, as well as all the other species of Geranium, a more or less durable yellow dye.

HERB-TWOPENCE. See CREEPING LOOSE-STRIFE.

HERON, the COMMON, or *Ardea major*, L. a predatory bird, which has a small lean body, but is provided with long legs, and a sharp-pointed bill.

The male heron is a very elegant bird; its forehead, crown, and upper part of the neck, are white; the head is adorned with a pendent crest of long black feathers; beneath the covers of the wings it also has a fine black plumage. The female, however, is not so handsome; she builds her nest either in trees, or in high cliffs over the sea, and forms it of sticks lined with wool: in the month of February, she deposits five or six large eggs of a pale green colour.

Herons were formerly much esteemed as a delicacy at the table, but their flesh has a strong taste of fish. They attain an age sometimes exceeding sixty years, and are very great devourers of fish, so that they occasion more mischief in a pond than otters. One heron will swallow fifty dace or roaches of a moderate size in a day; and it has been known to devour a thousand store-carp in a year.

When it is ascertained that one of these rapacious birds visits a fish-pond, he might be taken in a manner similar to that practised in catching pike. For this purpose, three or four small roach, or dace, are to be procured, and each should be fastened on a wire, with a strong hook at the end; the latter must be connected with the wire just below the gills, and passed immediately under the uppermost skin to the tail. Thus, the fish will be preserved alive for several days; a precaution which is essentially necessary; because, if dead, the heron will not attempt to bite. Next, a strong line about two yards long is to be prepared of silk and wire twisted together, one end of which should be fastened to the wire connected with the hook, and the other to a stone of about a pound weight:—three or four of such baits being placed in different shallow parts of the pond, it is very probable that the mischievous bird will be speedily taken by this stratagem.

HERRING, or *Clupea harengus*, L. a well-known fish, generally about seven or eight inches long, though it sometimes grows to the length of a foot: it has four gills, the fibres of which are remarkably long, and open very wide, so that this fish almost instantly dies, when taken out of water.

Herrings are found in great abundance, from the highest northern latitudes, down to the northern coast of France. They are also met with in the Yarmouth seas from the end of August till the middle of October; and are in full roe about the latter end of June, whence they continue in perfection till the beginning of winter, at which season they deposit their spawn.

Among the various methods employed for salting or curing herrings, and sprats, we shall briefly notice one, invented by Mr. BENJAMIN BATLEY, of Streatham, Surrey, merchant; for which he obtained a patent in September, 1800.—After severing the head, and taking out the entrails of the fish, he salts the body with bay, rock, or common salt (if not sufficiently salted as *sea-sticks)*, preferring, however, the bay or rock salt to the common, which is apt to absorb the pickle, and occasion the fish to *rust.* The patentee then prepares a pickle, consisting of one pound of bay salt, four ounces of salt-petre, from two to four pounds of molasses, and a gallon of spring-water; which is boiled till the other ingredients are dissolved. The herrings are then packed as usual in a cask; between every layer of them he sprinkles a small portion of salt, and also of pickle, to cover the fish; but leaves three inches of the head of the cask unstowed, in order to fill up that space with the pickle. When headed up, a cork-hole may be bored either in the head or centre of the cask, by means of which more pickle may, when necessary, be introduced, for the preservation of the fish.—With respect to the mode of curing sprats, the process differs in some particulars; and those who wish to acquire more minute information on this subject, we refer to the 14th volume of the *Repertory of Arts and Manufactures.*

By the 22d EDW. IV. c. 2, no herring shall be sold in any vessel, unless the barrel contain 32 gallons; and so in proportion the half barrel and firkin. Such fish are directed to be well packed, and all of the same salting, and to be as good in the middle of the cask as at the ends, under the penalty of 3s. 4d. for each barrel, &c. Lastly, by the 15 CAR. II. c. 16, the vessels for herrings are to be marked with the quantity they contain, and the place where packed: sworn packers are likewise to be appointed in all fishing ports, on pain of forfeiting 100l.

Considered as an article of food, *fresh herrings*, if moderately eaten, afford nutriment sufficiently wholesome; but, if taken in quantities disproportioned to the powers of digestion, they are attended with an alkaline putrid effect on the stomach. Farther, *pickled* herrings are very improper food; their flesh being thus rendered hard, and scarcely digestible: nevertheless, even in that decomposed state, they are not so injurious as herrings salted and dried.

HESSIAN FLY: See FLY, the *Corn.*

HICCOUGH, or HICCUP *(Singultus)*, a sudden convulsive motion of the stomach, occasioned by various causes, such as a fit of laughing, thirst, cold drinks, suppression of diarrhœa, antipathy, &c. It can by no means be considered as a disease, though a few instances have occurred, in which it has continued for three or four years; and one in which it became habitual, and could not be removed.

Persons who eat large meals, and load the stomach by drinking profusely after them, or those liable to flatulency, are chiefly subject to this affection.

The common hiccough seldom requires any medicine to remove it, as it generally disappears after drinking a few small draughts of water in quick succession; but, when it becomes very troublesome, a table-spoonful of vinegar may be swallowed. In several very obstinate cases, simple peppermint-water acidulated with a few drops of vitriolic acid, has procured immediate relief. Vomiting; sneezing; the application of cupping glasses, or aromatics to the pit of the stomach; the stench of an extinguished tallow-candle, and many other remedies, have occasionally been resorted to with success. In children, or nervous adults, sudden joy or fright, or the promise of an acceptable present, is often equally efficacious.

HIDE, generally speaking, signifies the skin of beasts, but is particularly applied to those of large cattle, such as bullocks, cows, horses, &c.

Hides are either raw or green, that is, in the same state as when they were taken off the carcass; salted or seasoned, in which case they are dressed with salt, alum, and salt-petre, to prevent them from putrifying; or they are curried or tanned; for an account of which processes, the reader will consult the articles CURRYING and TANNING.

In August 1783, a patent was granted to Mr. GEO. CHOUMERT, of Five-foot-lane, Bermondsey-street, Surrey, tanner, for his invention of a machine for cutting, splitting, and dividing hides and skins, both in the *pelt*, and after being dressed into leather, for separating the grain from the flesh-side. As, however, this patent, though expired, cannot be understood without a plate, and is, besides, not immediately connected with domestic economy, we refer the inquisitive reader to the 4th vol. of the *Repertory of Arts and Manufactures.*

Another patent was granted in May, 1801, to Mr. THO. BAGNALL, of Worsley, Lancashire, for a mill or machine for *beaming* or working green hides and skins out of the mastering or drench, and preparing them for the ouse or back liquor, and also for chopping, grinding, riddling, and pounding bark, and for other purposes. This machine may be worked by wind, water, steam, or any other power; but for the reasons before stated, we again refer the curious reader to the 15th vol. of the work above cited.

The hides of cows, oxen, horses, mares, and geldings, *in the hair*, pay on importation a duty of 9½d. per piece: those of cows and oxen, when tanned, pay 5½d. per lb.; and a convoy duty of 5d. per hide: those of horses, &c. in a similar state, are subject to a duty of 6½d. per lb., and to a convoy duty of 5½d. per hide. By the 9th GEO. III. c. 39, continued by the 36th GEO. III. c. 40, till the 1st of June 1803, and thence to the end of the next session of parliament, both raw and undressed hides of any kind whatsoever (except horse's, mare's, and gelding's) may be imported from Ireland or the British Colonies in America, free of all duties; provided they be duly entered and landed.

HIDE-BOUND, in farriery, a disorder to which horses, or other cattle, are subject. It is known by the rigidity of the skin, which apparently adheres to the animal's ribs, without the least partial separation. The horse is generally languid, dull, heavy, and weak; his excrements are dark, foul, and offensive; he falls into profuse sweats on every little exertion; and his whole appearance indicates great weakness.

Want of proper care, and bad food, such as rank long grass in swampy situations, and musty hay or oats, are the most probable causes of this affection. Few directions, therefore, will suffice, as the case is rather a temporary inconvenience than a disease. The animal should first lose a little blood, in order to induce a slight change in the circulation, which should be increased by giving him, three or four hours after blood-letting, a mash of equal parts of malt, oats, and bran. This mixture ought to be repeated every night for two weeks, during which period two ounces of sulphur are to be stirred in, every second night: the animal's regular diet ought to consist of equal parts of oats and bran, with a pint of old beans in each, to prevent the mashes from relaxing his body. Besides, it will be requisite to give him regular dressing, air, exercise, sound oats, sweet hay, and plenty of good soft water; by means of which he will speedily recover.

HIDE-BOUND, is likewise an appellation given by husbandmen to those trees, the bark of which adheres too closely to the wood, and obstructs their growth. The most simple remedy that suggests itself on the occasion, is, to cleanse the bark properly with flannel or a brush, and make slight incisions, longitudinally, round the whole stem; yet this operation will be most advantageously performed in the vernal months, or early in the summer.

HIGHWAY, a road or way through which all persons have a right to pass unmolested; for this reason, it is called the *King's highway*, though the freehold of the soil belong to the Lord of the Manor, or to the owner of the adjoing land. Only those ways which lead from and to different towns or villages, and such as are cart-roads, communicating with the former, are properly called *highways*: the care of repairing them, &c. is reposed in surveyors, who are empowered by various statutes to superintend them, and to see that no obstacles be laid in the roads.

By the 4th and 5th WILLIAM and MARY, a reward of 40l. is to be paid by the sheriff of the county for the apprehension of every highwayman; to which the stat. 8th GEO. the IId. c. 16, adds 10l. to be paid by the hundred indemnified by such taking: and all persons, robbed on the highway, have a right to sue the hundred in which such robbery was committed, *in the day-time*, for an indemnification.

HOARSENESS, a diminution of the voice, generally attended with an unnatural asperity and harshness. It arises, mostly, from defects in the larynx and windpipe; from an ulcerated or ossified state of those parts; or from the acrimony of the bile; and it is not unfrequently a concomitant of catarrhous coughs, and scorbutic affections.

Lubricating medicines ought first to be administered, in order to obtund the acrimony of the humours, and to relax the strictures of the glandular parts. For this purpose, mucilaginous broths; decoctions or infusions of emollient vegetables, such as the dwarf, common, and marsh-mallows; the syrups of hedge-mustard or horse-radish, will be found eminently serviceable.

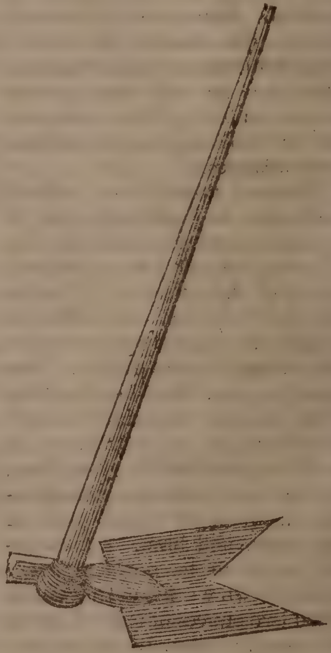
If hoarseness be the consequence of a COUGH (which see), the removal of that complaint will restore the voice to its natural tone. In every instance, however, the bowels ought to be kept regular; and, if scorbutic affections be the cause of hoarseness, it will again depend on the removal of the disease, which pervades the whole system. Where this complaint is inveterate, tonics, attenuants, and expectorants, have frequently been found of service.

In many recent cases, however, the most speedy relief will be obtained by bathing the feet in warm water for about half an hour, previously to retiring to rest; when, by a few days temperance in diet, and by carefully avoiding to take cold, this troublesome affection will gradually disappear.

HOE, or **How**, a well known implement of husbandry, designed for eradicating weeds from gardens, fields, &c. This tool is of great utility, and ought to be more frequently employed in stirring the unoccupied corners and spots of land, during the more vacant seasons of the year, by which operation the soil will be considerably improved.

To facilitate this important object, we shall present to our readers three hand-hoes, much superior to those in common use, and which, from their simplicity, deserve to be more generally known.

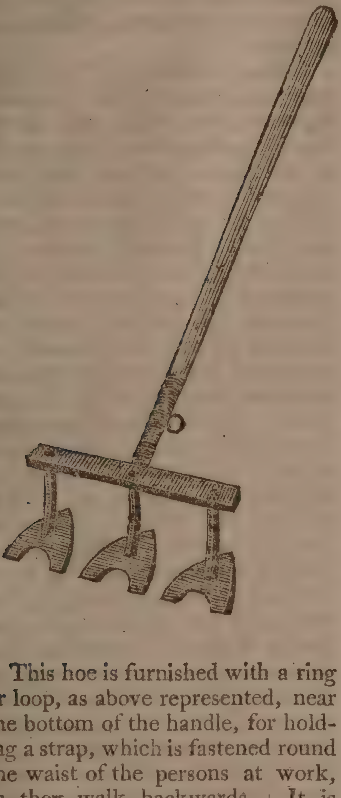
The first is the *Portuguese Hoe*, lately described and recommended by the patriotic Lord SOMERVILLE, and of which the following is a representation:



The handle of this implement is from three feet to three feet four inches in length; and, as it is both light and short, it is peculiarly calculated for strong lands and mountainous situations: because the hoe, by its weight and pointed form, cuts deeply into the earth, without requiring much exertion.

The second is the *Horse-shoe Hoe*,

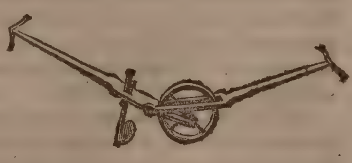
Hoe, invented by Mr. Mark Ducket, of Esher, Surrey:



This hoe is furnished with a ring or loop, as above represented, near the bottom of the handle, for holding a strap, which is fastened round the waist of the persons at work, as they walk backwards. It is eminently useful for cleaning crops of every description, whether *drilled* or *hand-set* in rows. Mr. Ducket has judiciously availed himself of a short handle, and heavy iron work, the exact reverse of the common hoe, which requires great exertion to make any impression on the soil (excepting on the lightest sands), especially if it has become dry and hard.

It is evident from the preceding cut, that Mr. Ducket's hoes, by their *convex* form, earth up as well as down; though the same implement may also be made with *straight* edges; namely, for drilled or dibbled crops at six inches interval; for clearing pease, beans, &c. at 18 inches distance; and for dressing crops of any description, at 12 inches interval.—Should these hoes, however, from their *straight* edge, be unequal to cope with stiff land, Lord Somerville suggests the expediency of adopting the *conical* edge (or the edge opposite to that in the horse-shoe hoe) which will remarkably increase their power. Lastly, his Lordship observes, that *three* flat hoes at six inches; *two* flat ones at twelve inches; and *three* horse-shoe hoes, form the whole number requisite; and that they all screw into the same frame and handle.

The last hand-hoe, we shall notice, is constructed on an improved principle, by Mr. James M‘Dougal, now of Oxford-street, London; for which the Society for the Encouragement of Arts, &c. in 1793, conferred on him a premium of twenty guineas.—This contrivance, which is represented in the annexed cut,



consists of two principal parts: the first of them is a beam of wood, which, at its fore-end, has a semicircle, forming two handles, between which one man walks, and draws the implement forward. At the other end, this beam is divided, and moves on two small gudgeons, by which it is accommodated to the height of the hands of the person drawing, and room is allowed for the movement of a wheel.

The farther end of the opposite beam is held by another person, who guides the hoe, and regulates the depth to which it penetrates the ground, while he at the same time assists its action by pushing it forward. The fore-end of this beam is also divided so as to admit a wheel to run between the sides, which serves to adjust the depth, and to ease the draught, in working the implement.

Mr. M'DOUGAL's hoes are made of cast-iron, and fixed in a mortice in the hinder beam, by means of a proper wedge: they may be made of different forms or dimensions, in proportion as is required by the peculiar nature of the work.

The design of this contrivance is to clear land from weeds, and to loosen the soil in the intermediate spaces of pulse or grain, sown in equi-distant rows, while the plants are at the same time sufficiently earthed up, in consequence of which they vegetate with increased luxuriance.

It is calculated to effect these objects in an eminent degree, and, from the simplicity of its construction, and the facility with which it is worked, it claims the attention of enlightened agriculturists.

HOEING, or HORSE-HOEING, in the drill-husbandry, is the breaking or dividing of the soil by tillage, while the corn, or other plants, are growing; it differs from the common mode of cultivation, which is always performed before the grain, &c. is sown, and is far more beneficial to the crop than any other method.

Horse-hoeing is practicable only on lands that are easily ploughed; and it is from inattention to this circumstance, that it has not been attended with success, and has, in many parts of England, fallen into contempt.

Having already, p. 171 of this volume, described Mr. COOKE's ingenious horse-hoe, and given ample directions for its use, we shall, in this place, mention only such implements as have not been specified in the article DRILLING, and which merit particular notice.

A horse-hoe on a new plan was contrived a few years since by the ingenious Mr. DUCKET, whose inventions we have had frequent occasion to mention. It is made wholly of iron (including the carriage); and consists of two common plough-shares, which work from twenty to twenty-four inches of ground in breadth, accordingly as they are *winged*. These are fixed by means of wedges into a twisted beam, and the whole is put together with such strength, that they may be worked with four horses, at any depth required. Mr. DUCKET applies his hoe to various purposes, but chiefly to the eradicating of pea, bean, and other stubbles, in order to prepare them for the plough; and so effectually does the implement answer, that the corn may be sown, even though the soil should not have been previously ploughed.

In the 2d vol. of Dr. ANDERSON's *Recreations in Agriculture*, we meet with an account of an improved method of horse-hoeing; which is stated to be performed in the most perfect manner, merely by the aid of a *double-mould-board-plough*. It is particularly calculated for the clearing of weeds, &c. from cabbages, round which the earth is heaped, so as to make those plants thrive with uncommon luxuriance. For a minute account of this operation, the reader will consult the work before quoted; where its superiority over Mr. TULL's horse-hoeing system is pointed out, and the subject illustrated with cuts.

The best season for hoeing good land is, two or three days after rain has fallen, or as soon after as the soil will notadhere to the hoe, when at work. Light, dry lands, indeed, may be dressed at almost any time; but the season for hoeing strong clay-soils, is very frequently short and precarious. Hence it will be useful to point out the proper juncture. There is a period between the time of the clay-soils running together so as to form puddles, in consequence of superfluous moisture, and that of their consolidating into hard cakes from great drought; when they are sufficiently tractable. This is the proper season; and whatever land is then hoed, will not cake together, till it has been again penetrated by rain; in which case the operation is to be repeated at the time just mentioned, and as often as is necessary, till the growing crop begins to cover the soil; when it will in a manner screen the surface of the land against the intense heat of the sun; and consequently in a great measure prevent the inconveniencies attendant on the consolidation of the soil, during dry weather.

By this successive hoeing, the land will be brought into a high state of improvement; and, if the weather prove favourable, good crops will be obtained, while, by a contrary practice, the soil is rendered useless; and, from the stagnation of the water, becomes a public nuisance.

HOG, or *Sus*, L. a genus of animals consisting of six species, the most remarkable of which is the *scrofa*, or Common Hog. Its body is covered with bristles, and it has two large teeth, both in the upper and lower jaw. In a wild state, this creature is of a dark brinded colour, and beneath the bristles is a short soft hair; its ears are more diminutive than those of tame hogs, which are long, sharp-pointed, and hang down; the colour of the latter is generally white, though sometimes mixed with other shades.

The hog is proverbially the most rude and brutal of quadrupeds; its habits are gross, and such is its gluttony, that it devours every thing indiscriminately. But, though it be the most impure and filthy of animals, its sordidness is useful, inasmuch as it swallows with avidity, refuse and offal of every kind, so that matters which would become a nuisance, are converted into the richest nutriment.

Sows generally breed at the age of 18 months, or two years, and bring forth from five to ten or more pigs, twice in the year, after a gestation of four months.

As hogs, from their voracious nature, will eat almost every thing, they are very generally reared in all situations, being quickly and cheaply fattened.—In miry and marshy grounds, where they delight to wallow, they devour frogs, fern, the roots of rushes, sedge, &c. In the drier countries, they feed on hips, haws, sloes, crabs, beech-mast, chesnuts, acorns, &c. on the last of which they thrive exceedingly. Of late years, however, the management of these animals has become an object of attention. Clover, potatoes, turnips, cabbages, and carrots are, it is well known, articles with which they may be fed, and even fattened, at a small expence. Parsnips are of considerable utility for this purpose, and probably the roots of the white-beet, if it were fully tried, would be found still more useful; for experiments have shewn, that it contains a considerable proportion of saccharine matter, and may be cultivated with very little difficulty. Cos-lettuces are likewise eminently serviceable, especially for young pigs, which, when fed on them, may be weaned a fortnight earlier than is usual. Pease also afford an excellent food for fattening, and if duly mixed with salt, will render the animals fit for sale at the end of five weeks.

In the vicinity of London, vast numbers of hogs are annually fattened with grains from the distilleries: such pork, however, does not take the salt so readily as the flesh of those pigs which have been fed with more substantial food, and been driven to the market from a considerable distance.

Hogs may with great advantage be folded on wheat, where the soil is loose, light, and friable; for they will drop a considerable quantity of dung, and tread the looser parts of the land so closely together, that it will not *hove* during summer; nor will the wheat be *root-fallen*. Particular care, however, ought to be taken, that these animals be *well ringed*; an operation that ought to be performed as early as possible.

The diseases to which hogs are subject, are but few; nor are they often troubled with them. The chief are, 1. The *measles*, said to be perceptible only in the throat, which, on opening the mouth, appears full of small tumors, that in some cases are visible externally. The remedy usually applied is the powder of crude antimony, in small portions, which generally removes the affection. 2. The *fever*, which is also called the *heaving of the lights*: it is cured by giving the diseased animal a mixture of oil and brimstone; 3. the *Mange*; 4. the *Murrain*, or *Leprosy*; and, 5. the *Gargut*; to which articles we refer the reader, in their respective order.

Hogs are very valuable quadrupeds, and their flesh furnishes at all times an agreeable meat. (See BACON, and HAM.) In a fresh state, it is called *pork*, and affords a wholesome and nourishing food to a sound stomach, when eaten in moderation, with sub-acid vegetables or sauces. Their lard, or fat, is applicable to various purposes, both culinary and medicinal. The blood, intestines, feet, and tongue, are all used in the kitchen; though the first is indigestible. The fat of the bowels and web, which differs from common lard, is preferably employed for greasing the axles of wheels. The bristles are made into brushes, pencils, &c.; the skins into sieves; yet the latter might be more advantageously tanned, and converted into shoes, as is the practice in China, where all the shoes sold to the Europeans at Canton, are made of hogs'-leather, the hair being previously burnt off with a red-hot iron.

The dung of swine is reputed to be next in value to that of sheep, and is particularly useful in destroying that pernicious weed, the Common Coltsfoot.—See COLTSFOOT and DUNG.

As hogs are animals of extensive utility, we trust it will not be uninteresting to point out those remarkable breeds which amply repay the expence of fattening them.

1. The *Berkshire* hog is spotted red and brown, attains a large size, has small ears, short legs, and very broad sides. They are highly valued; but, as they grow uncommonly large, no person should attempt to keep them, unless he be provided with a sufficient stock of food; as otherwise they will dwindle away, become diseased, and yield less profit than a smaller kind.

2. The *Shropshire* swine grow to a large size: they are generally white, have short legs, and long ears, which hang down upon their cheeks. This is a fine breed, much prized at Barnet-market, and bears a close resemblance to '

3. The *Northampton* hogs, which are white, have very short legs, and attain an extraordinary size, especially those reared at Naseby. They are chiefly distinguished by their ears, which are of an enormous size, much larger than those of the preceding breed, and sweep along the ground, so as almost to blind them.

4. The CHINESE breed (which is one of the most profitable kinds of hogs introduced into this country) is very hardy; will live on less food than any of the animals already mentioned; and seldom appears lean. They are mostly white, attain to a large size, and will *fatten well* on food that would *barely keep* other hogs.—To these may be added the *Suffolk* breed, which, in the estimation of some persons, is the best in England; and the *Leicester*, which is much fatter than that of Suffolk, but is said to produce *very few* pigs.

As many frauds are practised at markets and fairs, on the unsuspecting farmer or cottager, in the act of buying or selling hogs, we shall briefly communicate a few hints, that may furnish some rules for guarding against imposition.

In purchasing *lean* hogs, the most certain method is to judge by weight. If, therefore, a farmer were to weigh a few lean pigs which are about the size of those he intends to purchase, he would obtain some standard on which to proceed, and will consequently be able to bid a fair price in the market.

With respect to *fat* hogs, it has been proved from repeated experiments, that every 20lbs. live weight will yield, when killed, from 12 to 14 nett weight. In those which do not exceed 12 stone (14lbs. to the stone), the weight will be 12lb.; but, in larger animals, it will in general amount to about 14 lb. If, therefore, a farmer weigh them alive, he will not only know the clear profitable weight when killed, and consequently its value, but he will also, by weighing the animal every week, be able to ascertain the proper time to slaughter, or dispose of it to the best advantage; for, when the hog ceases to acquire that daily increase which renders it profitable, the best course that can be followed is, to kill him immediately.

HOG'S FENNEL. See Common or Sea SULPHUR-WORT.

HOGS-HEAD, in Commerce, a measure of capacity which contains 63 gallons.

HOG-WEED. See COW-PARSNIP.

HOLLY, or *Ilex*, L. a genus of shrubs consisting of 16 species; one of which is a native of Britain, namely, the *aquifolium*, or Common Holly-tree: it grows in woods or hedges, and produces small whitish flowers in the month of May, which are succeeded by scarlet berries that are ripe in December.

This evergreen is propagated by seed; for which purpose the berries are to be put into the ground for one year, after which they should be taken up, and sown at Michaelmas: the young plants will appear in the succeeding year. These are to be transplanted in the summer; and, if the operation be carefully performed, their growth will be rapid, especially if they be watered in dry seasons, and the soil about the roots be frequently loosened. There is a great variety of this cultivated shrub, all of which are propagated by budding, or engrafting them on stocks of the common green holly.

This species is of great utility: the croppings of its leaves afford, in winter, a grateful food to sheep; and its berries support the feathered creation, during that inclement season. The holly makes an impenetrable fence, and is eminently calculated for the formation of hedges, as it admits of being cropped, and retains its verdure, and the beauty of its scarlet berries, without receiving any injury from the severest winters. The common *birdlime* (see vol. i. p. 263) is prepared from the bark, after it has been fermented, and cleared from the woody fibres. Its wood is much used in veneering, and is frequently stained black, to imitate ebony. It is likewise advantageously employed in the making of handles for knives, and cogs for the wheels of mills.

In medicine, the leaves of the holly have lately been employed with uncommon success in cases of the gout, agues, colics, &c.: the birdlime obtained from the bark is said to be an excellent application to obstinate swellings.

HOLLYHOCK, or *Alcea rosea*, L. a beautiful exotic plant, frequently cultivated in our gardens. It is a native of China; grows to the height of 8 or 9 feet; and nearly the whole of its stalk is covered with white, red, brown, yellow, or variegated flowers, that continue to blow till September.

The hollyhock is propagated either by seeds, deposited in drills, about the middle of April, on beds of light earth, and afterwards covered with soil about half an inch deep; or, by separating and setting the roots. As soon as the plants shoot forth a few leaves, they are removed into nursery beds, where they require to be well watered till they have taken root; after which no farther care will be necessary till the month of October, when they should be transplanted to those places where they are intended to remain.

Beside the ornamental appearance of this majestic plant, Dr. Böhmer informs us that the soft, fibrous, and woody parts of its stalks, without any addition of rags, produce a white and fine paper.

Honesty. See Traveller's Joy.

Honewort, the Hedge. See Bastard Stone Parsley.

HONEY, a sweet fragrant vegetable juice, collected by the bees from the flowers of various plants, and deposited in the cells of the comb.

Having already treated of the best methods of taking the honey from hives (see vol. i. p. 227), we shall in this place only observe, that the honey produced by young bees, and which flows spontaneously, is purer than that expressed from the comb; whence it is called *virgin-honey;* the best sort is of a thick consistence, and of a whitish colour inclining to yellow; it possesses an agreeable smell and a pleasant taste.

As an article of food, when immoderately used, honey is pernicious to weak stomachs; it ought, therefore, to be avoided by persons liable to eruptions of the skin, or in whom there is a redundancy of bile. This vegetable essence contains an acid, similar to that of sugar, but is more spirituous: hence it readily ferments, occasions flatulency, and in some habits produces gripes and looseness.

As a medicine, however, it is a very useful aperient and expectorant, especially when it has been previously boiled; in which state it may be used with safety and advantage by asthmatic patients; for it tends to dissolve viscid humours, and to promote the expectoration of tough phlegm.—See also *Chapped* HANDS.

Notwithstanding these salubrious properties of honey, it is apt to produce effects very detrimental to those plethoric, bilious, febrile, or *cachectic* patients, who trust to it as a remedy in coughs, arising from, or connected with, pulmonary complaints. The writer of this article has lately seen two mournful instances of young females, each of whom, by a singular infatuation, had swallowed such quantities of a quack medicine, called "the balsam of honey," as amounted to the sum of *ten guineas,* in order to cure a catarrhal cough, and to prevent it from attacking the lungs. Unfortunately, however (and let it be recorded here as a warning to others), they had proceeded too far in slighting an organic affection, which preyed on the functions of life; and both, in the course of six months, fell victims to a fatal delusion.

Honey is also convertible into an agreeable liquor, termed MEAD, of which the reader will find an account in its alphabetical order.

Although Prof. LOWITZ has satisfactorily proved that honey may, by a chemical process, be consolidated into sugar; yet, as such a change would not be profitable, where the former is sold at a much higher price than the latter, we shall suggest a more advantageous mode of employing this balsamic juice. If a pound of honey be dissolved in three or four quarts of water, and exposed to a temperature between the 70th and 80th degrees of FAHRENHEIT's thermometer, it will in a short time become a very agreeable acid liquor, which possesses an aromatic flavour, and strength, superior to that of the best *vinegar* made of white wine. As the latter is frequently adulterated, and incomparably more expensive than the substitute we have proposed, this appears to deserve every attention in domestic economy.

HONEY-DEW, or *Suffusio mellita,* a sweet substance found on the leaves of oak, hazle-nut, hops, and other plants; and which has been erroneously supposed to fall from the sky.

According to Dr. DARWIN, the honey-dew is a saccharine juice that exudes from trees, in consequence of the retrograde motions of the cutaneous lymphatic vessels connected with the umbilical, or with the common sap-vessels of plants; instead of being carried forward to increase the growth of the present leaf-buds, or to accumulate nutriment for the buds, which are in an embryon state.

This exudation is consequently very injurious to the trees which are subject to it; especially from its great sweetness, which attracts immense numbers of bees and ants: no method of preventing it has hitherto been discovered.

HONEY-SUCKLE, or *Lonicera*, L. a genus of plants consisting of 20 species, two of which are natives of Britain, viz.

1. The *Periclymenum*, Common or Woodbine Honey-suckle, which grows in hedges and woods, and flowers from June to August. It is eaten by cows, goats, and sheep, but refused by horses.—The beauty and fragrance of its variegated flowers, render this species a pleasing ornament of our gardens, hedges, and arbours. The best, as well as the easiest method of propagating it, is by layers and cuttings, both of which readily strike root, and form plants that are fit to be set out in one year.—The ripe berries are strongly purgative.

2. The *Xylosteum*, or Upright Honey-suckle, which grows on walls and in hedges; it flowers in May.—According to LINNÆUS, this shrub forms excellent garden hedges in a dry soil, especially where flocks of sheep are frequently passing, as these animals do not eat the leaves. Its wood is extremely hard, and makes the best ram-rods, as well as pegs, or pins for musical instruments, teeth for rakes, and similar articles.—The small reddish and juicy berries excite vomiting, and are so powerfully laxative, that they are not touched even by birds.

HONEY-SUCKLE, the Dwarf.—See Dwarf CORNEL.

HOOF, the horny part which covers the feet of many valuable quadrupeds; but, in this place, we shall treat of it only so far as it relates to that useful animal, the *horse*.

A *perfect hoof* should be round, smooth, tough, and short, so that the horse may tread more upon the toe than upon the heel: it should also be rough and somewhat hollow within, having a narrow frush and broad heels.—On the contrary, imperfect hoofs are rather broad than round; and, if spreading out of the sides and quarters, the heels of such a horse are generally narrow, and will sooner or later become *flat-hoofed*, have a weak foot, and not carry a shoe long, nor travel far without surbating: thus, by treading more upon his heels than upon his toes, he will walk low on his pasterns, and his feet, through weakness, will become subject to what are called false quarters, gravelling (which see), and other maladies, of which we have subjoined a short account.

HOOF-BONEY, a distemper arising from external injury, either a stripe, blow, or by a horse bruising himself in his stall, by attempting to strike at the next animal, but missing his aim, and dashing the foot against the post or rail that separates them. It consists of a round horny swelling on the uppermost part of a horse's hoof.

To bring this hard tumor to maturity, it may be covered either with a poultice of hay boiled in stale urine, or with a plaster of wine-lees and wheat-flour simmered together over a fire. By such applications, it is generally dispersed;

persed: but, if it should come to a state of suppuration, it must be lanced in the soft, lower part with a thin, hot iron, to give vent to the matter; and then covered with a plaster made of the following ointment: Take equal parts of turpentine, deer-suet, and wax; melt them together carefully over a slow fire. The use of this salve should be continued, till the ulcer is perfectly healed.

HOOF-BOUND, an unnatural contraction of a horse's hoof, on the top and at the heel, so that the skin appears to grow over the hoof. It is easily discovered by the frequent halting of the horse, and the hollow sound of the diseased hoof: it arises from various causes, such as keeping him too dry in the stable; an injudicious method of shoeing; paring the soles as often as the animal is shod, &c.

As this malady always approaches gradually, it may be relieved at the commencement of every stage, or species of it, by proper management; but, if it become inveterate, no art whatever can effectually remove it.

The first species proceeds, in general, from the injudicious use of concave shoes, or from paring and hollowing out the sole and binders as often as the shoes are renewed. Hence, the heels become so thin, that the crust at the extremity may be forced into contact by the slightest pressure; the contraction of the hoof at length becomes general, and incurable. The only remedy in this case is, to keep the hoofs cool and moist, never to suffer them to be greased, or the soles to be pared, and to use only flat, narrow, and open-heeled shoes. Thus the stricture on the heels and frog will be in some measure removed, the animal affected considerably relieved, and the disorder at length so far palliated, as to enable him to walk with more firmness.

In the second stage of this evil, the crust at the coronet becomes contracted; the annular ligament compressed; and the hoof acquires the shape of a bell; the consequence of which is lameness. With a view to cure this, Mr. GIBSON proposes to trace several lines on the fore-part of the hoof with a drawing-knife, almost to the quick, from the coronet down to its basis, and then to turn the animal out to grass: others advise, after this operation is performed, to *screw* the heels *wide*, by means of a screwed shoe. A third method is, to draw the sole, and divide the fleshy substance of the frog with a knife, keeping it likewise separated by the screwed shoe. In recent contractions, either of these methods may be applied, and if dexterously managed, they will afford considerable relief.

The last species is a contraction of one, or frequently of both heels, in *flat* feet, from the use of concave shoes, &c. The best remedy in this case is, to lay aside such improper shoes; to pare or rasp to the quick the whole contracted quarter of the crust near the heel, but without drawing blood: a *barred* shoe is then to be put on, so as make the bar of the shoe press upon the frog; the hoof should be kept moist, and the diseased animal turned out to grass. Thus the stricture of the hoof will gradually disappear, the contracted part expand, and a new hoof grow from the coronet downwards, that will acquire a round, proper shape, and in a short time the horse will be restored to his former activity.

HOOF-BRITTLE, or BRITTLE-HOOF, a disorder in horses, which is either constitutional in the animal, or arises from a surfeit, and as farriers express it, falls down into his feet; or, is the consequence of the horse having formerly been *foundered* (which see). To remove this malady, some prescribe the following ointment to be liberally applied to the hoofs two or three times a day: Melt equal quantities of turpentine, mutton-suet, raw bee's-wax, hog's-lard, salad-oil, and deer's-grease (or the tallow of venison), in an earthen pot. After anointing the hoofs, "especially at the setting on of the hair," Professor BRADLEY adds, that they should be stopped "with cow's dung and dog's grease mixed together."

HOOF-CASTING, a misfortune that sometimes befals a horse, when the horny substance entirely separates from his foot, in consequence of his foundering or slipping, which breaks it on the top round the coronet, so that it at length drops off. We are not experimentally acquainted with any remedy that is likely to cure this malady; and therefore communicate the following recipe from Mr. BRADLEY's *Family Dictionary*, in which it is confidently asserted that this application "will undoubtedly bring on a new hoof:"—Take the strongest aqua-fortis; and, after having filed or otherwise taken away the old hoof somewhat near, touch the part so prepared with the liquor; three or four dressings being quite sufficient. Then anoint the foot with a salve made of hog's-lard, three pounds; patch grease (perhaps oil-cake), two; Venice-turpentine, one pound; new wax and salad-oil, half a pound each: mix and melt all these ingredients over a moderate fire, and anoint the coffin of the foot up to the top of the heel.

HOOF-HURT, an injury incident to working cattle, especially to oxen, which are sometimes wounded by a coulter or share of a plough in any part of the *clees*. It may be cured by a salve, consisting of pitch and lard mixed with powdered sulphur, and melted together: this preparation is applied to the sore hoof, or clee, by means of a hot iron; and it may likewise be rubbed over parts hurt by splinters of wood, as it is said to draw them out.

If, however, the injury be deep within the flesh, in consequence of striking the foot against some sharp stone, or other pointed body, in such case the wound should be opened; seared with a hot iron; bathed every morning and evening for three days with warm vinegar; and wrapped in a buskin made of broom.

When the wounded part has been so far neglected that worms are breeding in the sore, bruise and mix together some hore-hound, leeks, and salt, which ingredients should be spread on the foot, and covered with a plaster of tow, composed of pitch, oil, and rancid lard, in order to keep off flies and vermin.

HOOPING-COUGH. See CHIN-COUGH.

HOP, the COMMON, or *Humulus Lupulus*, L. an indigenous plant, growing in hedges, and flowering in June.

Hops delight in a good rich loam, with a deep sub-soil or stratum of a loamy a loamy brick-earth, in a southern or western exposure; though they grow in almost any ground that is not *wet*. They are chiefly cultivated in the southern counties of England, and are propagated either by nursery-plants or by cuttings. These are set in *hills*, formed by digging holes in the spring, which are filled with fine mould, and the number of which varies from 800 to 1000, or 1200 per acre. One, two, or three plants are put in each hill; but, if hops are designed to be raised from cuttings, four or five of these, from three to four inches in length, are planted and covered one inch deep with fine mould.

At the end of the first year, it becomes necessary to put poles into the hills, round which the bines reared from plants are wound: at the expiration of the second year, full-sized poles from 15 to 20 feet are set (though the hop-bines will run to the height of 50 feet), in the proportion of two poles to each hill, and a similar number of hop-plants are fastened loosely round each pole, by means of withered rushes.

Hops begin to blow towards the middle of June, and about the end of August they are generally fit to be gathered. The most proper time of collecting them is, when the leaf rubs easily off the bine, when the hops have a strong scent, and the seed assumes a brownish colour.

The culture of hops, though profitable when it succeeds, is very precarious: as soon as the plant appears above ground, it is attacked by an insect somewhat similar to the turnip-fly, which devours the young heads. Hop-gardens, situated on chalky soils, are peculiarly subject to its depredations; and the best remedy is to manure the soil highly with *malt-culm*, which adheres so strongly to the insects, as to prevent them from creeping over the plant.

In the months of June and July, the hops are liable to be *blown* by a species of *aphis*, or fly, that poisons the leaf, by voiding its excrement; which is particularly injurious during hot, cloudy, and moist weather. This insect, however, does not endanger the growth of the plant, unless it be in a weak state, in consequence of the depredations committed on its root by the larvae of the ottermoth, or *Phalœna Humuli*, L. For the expulsion of these vermin, Dr. WITHERING recommends to cover hop-gardens with stones or flags; because, when hops grow wild in stony places, where the moth cannot penetrate to deposit its eggs, they are never affected with the honey-dew.

There are two other distempers incident to hops, namely, the *Fen* and the *Smitt*, for which no effectual remedy has hitherto been discovered. Hops may, however, when gathered, be perfectly secured from the future depredations of insects, by putting a small quantity of brimstone in the fire, while they are drying in the kiln, by which means the vermin is not only destroyed, but the superfluous moisture is more speedily evaporated, and the hops acquire a brighter colour.

The hop is a most valuable plant: in its wild state it is relished by cows, horses, goats, sheep, and swine. When cultivated, its young tops are eaten, early in the spring, as substitutes for asparagus, being wholesome and aperient; they are sold under the name of *Hop-tops.*

The principal use of hops, however, is in brewing, for the preservation of malt liquors, which are thus rendered more salubrious, and less liable to become sour. Hence vast quantities are consumed in Britain: but, having already pointed out the most proper methods of using them, under the head of BREWING, we refer the reader to that article.

A decoction of hops diluted with water, and given to cattle in very severe weather, is said to be of great service, and remarkably to improve their strength. In Sweden, the stalks of hops are successfully converted into strong cloth; for which purpose they are gathered in autumn, soaked in water during the winter, and in the succeeding spring, after being dried in stoves, they are dressed like flax. This object has been attempted in Britain, and from an experiment made, in consequence of the premium offered by the patriotic *Society for the Encouragement of Arts,* &c. it appears that hop-bines afford a material for spinning yarn, which may be woven into fine sacking, as well as coarse bags for hops. — The bines are also employed for binding the sheaves of corn; and they have lately been converted into strong paper.—From the leaves and flowery stalks of this plant, when dried, DAMBOURNEY dyed wool of a fine cinnamon brown, having previously dipped it in a diluted solution of bismuth.—BERTHOLLET remarks, that the expressed juice of hop-bines affords a very permanent red-brown colour.

In medicine, decoctions and syrups of hop-flowers are said to be attended with much benefit in pestilential fevers: a pillow filled with them, and laid beneath the head, has been found to procure sleep to patients afflicted with delirious fevers.—The heads and tendrils are likewise of considerable service in the scurvy, and other cutaneous affections.

HOP-TREFOIL: See CLOVER, the Hop; p. 11, of this volume.

HOREHOUND, the WHITE, or *Marrubium*, L. a genus of plants comprising 12 species, one of which only is indigenous, viz. the *vulgare*, or COMMON WHITE HOREHOUND, which grows on road sides, and among rubbish; it flowers from July to September.

This very bitter plant possesses an odour sufficiently grateful; when given in large doses, it operates as a purgative. It is reputed to be both attenuant and resolvent; an infusion of the leaves in water, sweetened with honey, is recommended in asthmatic and phthisical complaints, as well as in most other diseases of the breast and lungs.—We believe, however, it may with equal, or greater advantage, be employed in currying or tanning soft leather.

Bees collect honey from the flowers of the Common White Horehound, but the herb is not eaten by either horses, cows, sheep, or goats.

HOREHOUND, the BLACK, FETID HOREHOUND, or HEN-BIT, *Ballota nigra*, L. an indigenous perennial plant, growing on rubbish and in hedges; flowering in the months of July and August.—No species of cattle will touch this vegetable, which is, nevertheless, highly prized by the Swedes, who consider it as an almost universal remedy in the diseases of cattle.

A strong decoction of the Fetid Horehound has been much recommended in hysterical and hypochondriacal cases. An infusion, or tea, made of equal parts of this plant, of betony leaves, and white horehound, is asserted by RAY, both to prevent the gout, and mitigate the attacks of that painful disorder, if three or four tea-cupfuls of it be regularly drunk every day.

HOREHOUND, the WATER, or GYPSYWORT, *Lycopus Europaeus*, L. an indigenous perennial plant, which grows on sandy ground, on the banks of streams and ponds; it flowers from July to September.

The French manufacturers are chiefly indebted to this plant for the deep black colour of their cloth; its juice imparts a permanent dye to wool, silk and linen, and is much used by travelling gypsies, for the purpose of staining their faces.

HORN, a hard substance growing on the heads of various animals, particularly on cloven-footed quadrupeds.—The oil extracted from it, by repeated distillations, becomes extremely subtle and volatile; in which state it is called *oil of* DIPPEL, being the name of its inventor.

The horns of stags yield the greatest proportion of rectified animal oil, as they contain a larger quantity of that species of earth which is found in bones, than those of any other animals.

Horns form a considerable article in the arts and manufactures, Those of bullocks, when softened by heat, are converted into lanthorns, combs, knives, inkhorns, &c. After the horn is *roasted* over a fire made of the stalks of furze, so as to render it sufficiently soft, it is slit on one side, and spread out between a pair of flat tongs, large enough to keep it expanded a second time over the fire, and reduce it to a flat state; it is then put into a press between iron plates, which are heated and greased. Here the horns are suffered to remain till they are gradually cooled; next they are soaked in water, till soft enough to be pared down to a proper thinness, with a large knife worked horizontally on a block. Thus, they acquire their transparency; and, after being immersed in urine, they are polished, by rubbing them with whiting and the coal of burnt willow.

The refuse or shavings of horn are of considerable utility as a manure for chalky land, on which they are strewed in the proportion of fourteen bushels per acre. Their efficacy was not exhausted after a succession of four crops, each of which was remarkably improved. Hence they are advantageously employed on light and gravelly soils, together with hotter manures, preventing the latter from burning the crops; because horny substances have been observed to attract the dew, and retain moisture.

HORN-BEAM, or *Carpinus*, L. a genus of plants consisting of five species, one of which is a native of Britain; viz. the *Betulus*, Common Horn-beam-tree, Hard-beam-tree, Horse or Horn-beech-tree. It grows in woods and hedges; flowers in the month of May.

The horn-beam will thrive on poor, stiff soils, on barren and exposed hills; and, if intended for trees, it is propagated by seed, as soon as it is ripe. It vegetates eighteen months before the plants appear above ground; and the young trees are transplanted at the age of two years, to the spots where they are intended to remain. When designed for hedges and underwood, it is propagated by layers.

The horn-beam is a very valuable tree, and grows to a large size; its leaves afford a grateful food to cattle, but no grasses will flourish under its shade. Its wood is very tough, white, and burns like a candle; it is much employed by turners; is very useful for various implements of husbandry; and is wrought into cogs for the wheels of mills, presses, &c. which are far superior to those made of yew.—The inner bark imparts a permanent yellow colour to yarn.—See also p. 257, FENCE.

HORN-DISTEMPER, a disorder incident to horned cattle: it gradually wastes the internal substance of the horn, commonly called the *pith*, which is the spongy part of the bone, and the cells of which are filled with an oily matter. Thus, at length, the horn becomes hollow.

From an account published by Dr. TOFTS, in the 1st vol. of the *Memoirs of the American Academy*, it appears that this spongy bone is sometimes partially, and sometimes entirely, consumed. The horn is deprived of its natural heat, and on touching it, feels unusually cold. When this malady is suspected, other symptoms should be particularly attended to; such as dullness in the countenance; a sluggish motion; want of appetite; a desire to lie down; and, if attended with an inflammation of the brain, a giddiness, and frequent tossing of the head. Stiffness, as in the rheumatism, affects the limbs; the milk often fails in cows; the udder is hard, and there is in most cases a sudden wasting of the flesh.

As soon as the distemper is discovered, an opening should be made in the diseased horn, with a gimlet of a moderate size, two or three inches above the head. If it be found hollow, and the gimlet pass through without any discharge of blood from the aperture, it will be advisable to bore lower, and as near to the head as the hollowness may probably extend. This aperture is asserted to be a necessary operation, and frequently affords speedy relief. It should, however, be carefully kept open, as it is liable to be filled up by a thin fluid that gradually oozes out, and obstructs the passage. Sawing off the horn has sometimes been adopted; but, from the best observations, boring is a preferable expedient. Dr. TOFTS supposes injections to be useless; as nothing more is required than to perforate the horn in an early stage of the distemper; and to keep it open, in order to admit fresh air, to prevent compression, and to promote the discharge of fluctuating matter. Should, however, the distemper have affected the brain, so as to produce a high degree of inflammation, no method of cure is likely to succeed; and the animal ought to be killed without farther delay; as otherwise its flesh would become useless.

HORNED POPPY. See POPPY, the Horned.

HORNET, or *Vespa Crabro*, L. a well known insect, which is about one inch in length, and builds its nest in hollow trees.

Hornets are very voracious, devouring other insects, and even bees. Their sting is severe, and occasions a considerable tumor, accompanied with intense pain; for the mitigation of which, there is no better remedy than sweet-oil, or honey-water, immediately applied to the injured part.

Different methods have been suggested for exterminating these pernicious insects; the most simple of which appear to be the following: Towards the end of April, hornets are found on rotten planks, gates, and posts, in a torpid state: each of these insects contains the generation of a swarm; and as they may then be easily taken, the destruction of one, before they breed, is equal to the extirpation of numbers. After they are hatched, hornets chiefly infest melon-beds, where they occasion great injury to the fruit. In order to prevent these depredations, it has been recommended to procure slender rods of different lengths, and to rub the ends of them with bird-lime. By touching the insects with these rods, they may easily be taken; and, as the *females* only proceed in quest of food, by destroying these, the whole brood will consequently perish.

HORSE, or *Equus*, L. a genus of quadrupeds consisting of five species: the principal of these is the *caballus*, or common horse, which has a flowing mane, and the whole of its tail is covered with long hair.

There are, strictly speaking, no wild horses to be met with at present; and those which are suffered to roam at large in Tartary, Siberia, and America, are of a small size, inelegant form, and extremely intractable.—In a domestic state, the horse is bold, intrepid, docile, and attached to the company of man: indeed no quadruped is so eminently qualified for both purposes, the saddle, and the harness. In the breeding of horses, however, sound and well-shaped animals ought to de selected with particular care; as the strength and excellence of the race entirely depend on this circumstance. For *elegance*, the Spanish and Italian breeds are preferable; but, for the more useful purpose of *draught*, those of Britain, Normandy, and Holstein, are the most esteemed.

The females, or mares, bring forth one colt after a gestation of eleven months: none of the parent creatures should be under four years of age. Castration is commonly performed when the colt is twelve or eighteen months old; but the most general, and, we believe, the best practice is, to delay that operation till the animals attain the age of at least two years; for they will then retain a greater degree of strength and spirit. If properly kept, they live to the age of forty years; but mares do not breed after eighteen, and stallions are useless at the age of twenty, so that they are fit only for the harness.

The horse being an animal of extensive utility, the most proper and least extravagant manner of feeding and keeping him, becomes an object of considerable importance. Hence, potatoes, carrots, furze, cabbages, &c. have been successfully tried as substitutes for oats, and the more expensive method of *corn-feeding*: where, however, grain *is* used, the most economical way will be to *boil*, and give it in a cool state to the animals, together with the liquor; by which simple means *one half* may be saved. Carrots are particularly serviceable, as broken-winded horses, when fed on these roots, speedily recover. A considerable reduction may also be made, by cutting the hay into a kind of chaff, and mixing with it straw, or the broken ears of corn, which arise in dressing grain; and also by *soiling* horses with lucerne, tares, or clover, instead of turning them out to grass in the summer; for, if they be well littered, the dunghill will nearly repay the expence of their maintenance.—See also the articles FURZE, and LINSEED.

The management of horses, after having performed the labour of the day, is a matter of equal moment with their feeding; and, as considerable expence has injudiciously been incurred, by erecting elegant stables, we propose the following practice to the consideration of the rural economist. It consists, simply, in forming a small yard provided with a shed that is open in the front, and furnished with racks, as well as a pump and cistern placed in one of the corners. A superstructure of this kind, if well littered, is in every respect preferable to a stable, and will preserve horses in better health, without requiring any other currying or dressing, than is usually given by farmers' servants. The utility and convenience of such a yard have been fully evinced by a patriotic nobleman, the Earl of DARLINGTON, who has followed this practice with great success for several years, and observed, that horses thus managed, not only are more healthy than in stables, but at the same time able to work well, even after the age of twenty years.

The *diseases of horses* are various; but as we treat of them in their alphabetical series, we shall here only offer a few hints to the proprietors of these useful animals, by which many disorders may be easily prevented.

In all fresh wounds, the principal objects of attention are, to keep them clean, and protect them from the air; but, if any swellings or local humours arise, or the skin be bruised without being broken, they will be effectually removed, by applying GOULARD's mixture, which is prepared by adding two teaspoonfuls of extract of lead, and one large spoonful of strong camphorated brandy, to a pint of water; the whole is to be well shaken together, and set apart for use.

There are many diseases in which clysters are an excellent remedy; but they are frequently administered with so little skill, by means of the common clyster-pipes, that they are of no service. Hence it will be useful to procure a pipe made of pewter, the body of which should be larger and longer than a quart pot: at one end let a handle be fixed, and at the other a tube which lessens gradually, in the same manner as a common squirt. This will absorb a pint or quart of any preparation, and discharge it with proper force.

Numerous disorders, however, arise from excessive labour; and the injudicious application of ill-formed shoes. To remedy this serious evil, the attention of farriers has lately been directed towards the improvement of horse-shoes, and the invention of such as may prevent pain, and render this valuable animal *sure-footed*. We shall, therefore, take notice of the different patents that have been granted for this purpose, under the article SHOE.

We have already observed, that the English horses are eminently adapted to the different purposes of agriculture. The breeds of cart-horses, which deserve more particular attention, are the large black ones bred in the counties of York and Northampton, and the *sorels*, for which the sandy tract of land in the vicinity of Woodbridge, Suffolk, has long been celebrated. The former are chiefly used by those farmers who are in the habit of purchasing *two-year-old colts*, which they work lightly for two or three years, and then sell them for *coach-horses*. This practice merits severe reprehension; for, independently of the great risk in keeping valuable horses during the most critical period of their age, such precaution is necessarily attended with additional expence. The *York* and *Northampton* breeds, however, are reputed to be much inferior to the Suffolk *punch sorels*, which are admitted to be the best cart-horses in England. These are of a bright sorel colour; have very low *fore-hands*, large bodies, somewhat similar to those of cows, short legs, and ill-shaped heads; yet, though their appearance be thus aukward, they exceed every other breed in draught. These animals are of all sizes; but the smaller ones, 14½ hands high (the price of which is from 40l. to 50l. per pair), will be of great service.

The long-contested question, whether oxen or horses are preferable for agricultural purposes, we shall not venture to decide; though it will be useful fairly to appreciate the advantages, as well as the disadvantages, which attend the maintenance of either.

Oxen will draw the plough on tough clay soils and hilly lands, while horses stand still; but, on even and light ground, the latter not only work faster than oxen, but are incomparably more active for carriage. It deserves, however, to be remarked, that oxen may be maintained at a very small expence. The price of *two* horses is computed to be equivalent to that of *nine* oxen: the food of the latter, during summer, consists merely of *grass*, and in winter of *straw*, on which provender they may perform moderate labour; and, when *worked hard*, they are allowed a little *hay*. On the contrary, the food of a horse generally is hay, oats, beans, &c. The number of cart-horses constantly employed in Great Britain, is calculated at 500,000,—300,000 of which are allowed, by the most competent judges, to be superfluous. These consume daily, upon an average, during nine months in the year, one peck of corn each; which amounts to *sixty-three* bushels each per annum; that is, (allowing one quartern loaf per week to every person, and computing only 12 loaves to the bushel) as much corn as will support *seven* persons; so that 300,000 superfluous cart-horses, *moderately* fed, require for their support a quantity of corn sufficient to maintain 2,100,000 persons! which number, if the inhabitants of Great Britain amount to ten millions, is nearly one fourth part of the whole population.

To invalidate this statement, it has been objected, that though oxen *may* be maintained at a less expence than horses, yet the latter are far preferable, as they perform their work with much greater alacrity; and that the extra ploughing which a pair of horses will accomplish in *one* week, will fully pay the balance of keeping. Such is the difference of opinions, in the communication of which we have strictly adhered to facts; yet it ought in justice to be added, that an ox *improves* in value 2l. per annum, upon an average, from the time he is used and fed as an *ox*;

and, when fattened, affords good and wholesome meat; while a horse progressively *declines*, till he, literally, "is of no value."

Of the *number* of pleasure horses kept in England only, we have already spoken, p. 333, of our first volume; but, in this place we are induced severely to censure the inhuman practice of *docking* and *nicking* their tails, for no other reason, than to *improve* the beauty of their appearance, and to prevent them from "flinging the dirt;" thus depriving them of a very useful part, which was certainly designed by Nature for defending them from flies and other insects, during the summer heats, if for no other ostensible reason. Besides, it is highly probable that the tail assists the animal even in his common exertions; balances his body when trotting, and thus prevents him from stumbling; for it has been observed, by those who are conversant with the manners and customs of the East, that the horses of Turkey and Persia seldom stumble; a circumstance easily accounted for, as the absurd and brutal practice of *docking* is unknown in those countries.

Another operation, equally cruel and injudicious, is that of *cropping* the ears of horses, which may perhaps be justified, where an animal has large, wide lopping ears, destitute of all spring or motion, and which are in some degree a deformity. But to cut off a pair of fine ears from a horse's head, merely to gratify the ridiculous taste of grooms and jockies, is, if possible, still more absurd than to *dock* or *nick* his tail. It is, indeed, utterly indefensible: for the ears neither retard the animal's motion, nor "fling dirt."—We trust the day is not far distant, when this senseless prejudice will lose its influence over those men of sense and understanding who are now fascinated by it; and when the vitiated taste of horse-dealers will be treated with merited contempt.

Independently of the important services which the horse renders mankind by his labour, his dung affords an excellent manure; a short account of which we have inserted, p. 198 of the present volume. The urine, or stale, of these animals, likewise furnishes an excellent fertilizing liquor, if preserved with the brine, suds, &c. of the house: some caution, however, is necessary, in applying it to the soil.

Horse-urine is equally beneficial to all lands; but it should be previously diluted in a proper vessel, with half the quantity of *pond-water*, and in that state poured on the ground. Thus, the great heat of this manure, which, in particular seasons, is apt to burn some crops, may be easily corrected.

As the utility of horses exceeds that of all other domestic animals, we shall subjoin a few characteristic marks, by which their general qualities may be ascertained, and some of the numerous frauds committed by grooms, jockies, &c. opportunely prevented.

In old horses, the *eye-pits* are generally deep: this mark, however, is very uncertain, as it is also found on young animals descended from aged stallions. But the most certain criterion is that derived from the teeth, the number of which amounts to 40; namely, 24 grinders, or double teeth, 4 tushes, and 12 fore-teeth: these last are the surest guides for discovering the age of a horse. They appear about 12 days after the colt is foaled;

ed; are round, short, not very solid, and successively cast and replaced by others. When two years and a half old, the two middle fore-teeth in the upper jaw, and those in the lower jaw, are cast: in the course of another year, four others drop out, one on each side of the former. At the age of about $4\frac{1}{2}$ years, the horse loses four others, and always next to those which have already fallen out and been replaced. These four foal-teeth are succeeded by four others, but do not grow so quickly as the eight first, and which are called *corner-teeth*. They replace the four last foal-teeth, and are the chief marks by which the age of a horse may be ascertained: they are the third, both above and below, counting from the middle of the jaw, being hollow, and having a black mark in their cavity. When the horse is four years and a half old, they are scarcely visible above the gum; and the cavity is very sensible: in the course of a year and a half, they begin to fill; and the mark continually diminishes, and contracts, till the animal attains the age of seven or eight years, when the cavity is completely filled, and the black spots disappear. These teeth cease to afford any knowledge of a horse's age, after *eight* years, when it is ascertained by the *tushes*, which are the four teeth next to those last mentioned, and which, like the grinders, are not preceded by any other teeth. The two in the lower jaw usually begin to shoot at $3\frac{1}{2}$ years; those in the upper jaw at 4; and both continue very sharp pointed till the animal is 6 years of age. At 10 years, the teeth in the upper jaw appear blunted, worn out, and long; the gum contracting in proportion to the increasing years; and the more exposed the teeth are, the greater is the age of the horse.—From 10 to 13, or 14, little can be perceived to determine the age; but at that time of life, the upper teeth seem blunted, the gum contracts, and these useful bones are left bare. In proportion, therefore, to the greater or less degree of these marks, the age of a horse may be determined; and likewise, though not perhaps with equal accuracy, by the bars in the animal's mouth, which decrease as he advances in years.—On this occasion, it will not be useless to point out an odious practice, of which many ostlers and stable-keepers are guilty, especially towards the horses of strangers. When provisions are at an exorbitant price, those inhuman monsters have sometimes the cruelty to mix a few leaves of the bird-cherry (vol. i. p. 509) among the hay, or to rub the fatigued animal's teeth with tallow, or soap: in either case, it will obstinately refuse food, and not eat, till the hay is changed, or the teeth have been properly scoured with common salt.

In a horse that is free from blemish, the legs and thighs are well shaped; the knees straight; the skin and shanks thin; the back sinews strong and firm. The pastern joints should be small and taper, and the hock lean, dry, and not puffed up with wind. With respect to the hoof itself, the coronet ought to be thick, without any tumor, or swelling; the horn bright, and of a greyish colour. The fibres of a *strong foot* appear very distinctly, running in a direct line from the coronet to the toe, like the grain of wood. Such a foot, however, ought to be kept moist and pliable; as it is subject to fissures and cracks, by which the hoof is sometimes cleft through the whole length of the coronet. A *narrow* heel is likewise a great defect; and, if it do not exceed two fingers in breadth, it forms an imperfect foot. A *high* heel often causes a horse to trip and stumble; while a low one, with long, yielding pasterns, is apt to be worn away on a long journey. On the other hand, a foot disproportionately large, renders the animal weak, and clumsy in its gait.

The head of a horse ought to be small, and rather lean than fleshy; his ears should be erect, thin, sprightly, and pointed; the neck arched towards the middle, tapering gradually towards the head; the shoulders rather long; the withers thin, and enlarge by degrees as they extend downwards, yet so as to render his breast neither too gross nor too narrow. Such are the principal characters, by which the best form and proportion of that useful animal may be determined.—Those of our readers who wish to obtain more extensive information relative to this interesting subject, may with advantage peruse *Ten Minute's Advice to every Gentleman going to purchase a Horse*, &c. (12mo. 1s.); a small work, but which is replete with practical information.

Horse-bean. See vol. i. p. 203.

HORSE-BREAD, an expensive preparation given to horses, and consisting of wheat, oats, and beans; to which are sometimes added, aniseed, liquorice, eggs, and ale; at others, rye and *white-wine*.

There are three kinds of bread usually allowed to *race-horses*, for the second, third, and fourth nights' feeding; all of which are prepared with *wheat*, and *beans* worked with *yeast*; the difference in the proportions is as follows: in the first sort, a triple quantity of beans is used to one part of wheat; in the second, equal portions of both are employed; in the third, three-fourths of wheat are added to one part of beans!

These artificial stimulants, however, produce only a temporary effect; nor do they contribute to the future health and prosperity of the horse. Indeed, we doubt whether, in the present unprecedented state of the market, *horse-racing* can be reconciled to the principles of justice and humanity; unless it be admitted, that the fluctuating, though always exorbitant, price of corn, within the last two years, must be attributed chiefly to the vile arts and evasions of the law, practised by monopolizers, regraters, forestallers, &c. These pests of society have apparently succeeded in creating a *constant factitious scarcity*, which, it is to be apprehended, will prevail, and elude the utmost vigilance of the magistrate, till the *circulating medium* be regulated, and the bank-notes of private individuals reduced to their true value.

After this involuntary digression from the subject, we shall conclude with stating a very useful practice, that is followed in many parts of Denmark and Germany, with a view to preserve the health of that noble animal, the horse; and at the same time to keep him in "good order." It simply consists in mixing a handful of the dried and pulverized seed of the common nettle, every morning and evening, with his allowance of oats. Others add a handful of salt to each meal, and occasionally a few boiled carrots, which remarkably contribute to render his flesh plump and firm. Of the good effects of nettle-seeds, we can speak from experience, having frequently observed that they improve the *coat* or hair of the animal, by producing an uncommon gloss and smoothness.

HORSE-CHESNUT, or *Æsculus*, L. a genus of exotic plants, natives of the East, consisting of four species: the principal of these is the *Hippocastanum*, or Common Horse-chesnut. It thrives best in rich fat land, but will also flourish on clayey and marley soils.

The horse-chesnut was brought from Asia to Europe, in the year 1550: it is propagated from the nuts, which are gathered in autumn, and set in drills, about three inches asunder. In the spring, young plants will appear, which, at the end of twelve months, are to be taken up, the top roots shortened, and afterwards planted in a nursery. As soon as they are of a proper size to be finally transplanted, they should be carefully removed, and set in large holes level with the surface of the ground, all the fibres being spread, and covered with fine mould. A stake should then be placed, to protect them from high winds, and the depredations of cattle, till they are of a sufficient size to defend themselves.

This tree grows so rapidly that, in the course of a few years, it becomes large enough, in groves and alleys, to afford a good shade during the heat of summer, when it is in full bloom.—Its fruit furnishes a grateful food to horses, and has been successfully employed for fattening cattle, the tallow of which it renders uncommonly firm, especially when mixed with ground barley. The milk obtained from cows fed with it, is also said to be richer than that produced by any other aliment. The nuts have likewise been used with advantage in feeding poultry; but they are unwholesome for hogs. Deer are peculiarly fond of this fruit; which has also been usefully substituted for soap; because, on steeping and boiling it in water, it makes a good lather, preparatory to the use of that more expensive article. There are, besides, various other purposes to which horse-chesnuts may be rendered subservient in the arts and manufactures.

Dr. Böhmer informs us, that M. Sprögel, an ingenious artisan of Gera, in Saxony, has discovered a method of preparing a paste, or size, from wild chesnuts, which may be used preferably to that made of wheaten-flour, by shoemakers, book-binders, card-manufacturers, and especially by paper-hangers, who consume, or rather *waste*, considerable quantities of grain, in their respective branches of trade. With this design, the nuts are first cleared of the hard shell, as well as the inner skin; then cut into three or four parts; dried hard in an oven; and afterwards reduced to fine flour, either in a mill or mortar: rain-water is next poured on them, and the whole is properly stirred till it acquire a due consistence. This paste possesses a great advantage over the common *size*; as no moths, or vermin, will breed in the articles cemented with the former; but as it is apt to become mouldy, or sour, in 48 hours, it will be necessary to dissolve a small portion of alum in the water before it is mixed, or to employ equal quantities of chesnut and wheaten-flour: such precaution, however, is unnecessary, when it is intended for immediate use.

Prof. **Beckmann** states, that horse-chesnuts yield, by distillation, a spirituous liquor, which, notwithstanding its bitter taste, may frequently serve as a substitute for alkohol; and, though 20 pounds of this fruit produce only three ounces of a pure spirit, yet it is equal to that obtained from wine-lees, and the remainder still affords food for cattle.

Prof. **Leonhardi** observes, in his *Economical Pocket-book* for 1793 (in German), that the prickly husks of the horse-chesnut may be advantageously employed in tanning leather; and, when burnt to coal, they are said to produce an excellent black water-colour.—**Suckow** has made experiments with the brown glossy shell of this fruit; from which it appears, that, when bruised and boiled in water, with the addition of a little pot-ash, it makes a saturated dark-brown dye, which imparted to cloth previously dipped in a solution of green vitriol, a yellow brown, and to that prepared in alum-water, a faint red-brown colour.—According to **Dambourney**, both the branches and leaves communicate a good brown in dyeing.

Rüger (in his *German Pocket-book for Painters)* gives the following recipe for preparing an excellent brown water-colour: Take the smooth, ripe shells of the horse-chesnut, reduce them to a coarse powder, and boil them for several hours in water; next filter the liquor through flannel, and let it stand till the colouring particles subside; then carefully decant the clear fluid, and dry the sediment. Even in this simple manner, the decoction afforded a beautiful brown colour; which, however, was considerably improved, on adding a small portion of gum arabic.

The wood of the horse-chesnut is, in every respect, equal to that of the common chesnut; and, as the former thrives luxuriantly in coppices, it deserves to be more generally cultivated, with the view of raising timber for building. Indeed, it is highly probable that the fruit of this valuable tree might be so much improved by engrafting and inoculating, that the nuts may, in process of time, be divested of their peculiar bitterness and astringency.—See farther, pp. 512 and foll. of our first volume.

In medicine, the bark has been found of eminent service in intermittent fevers, and is often substituted in Russia for the Peruvian bark.

HORSE-FLY, or *Hippobosca*, L. a genus of insects, comprising four species: the principal of these is the *equina*, or Common Horse-fly, which equally torments horses and cows.

The horse-fly is broad, flat, shining, and apparently covered with scales; its head, breast, and belly, are of a yellowish colour, streaked with brown. These insects are very difficult to be killed, on account of the hard scaly wings with which they are covered; and so firmly do they adhere to the poor animals, that these can neither rub nor bite such pernicious vermin off their skin, without severely wounding themselves. Hence the only preventive we can devise, is a net for covering the horse in hot weather, or in travelling through woods, or such places as are infested with these troublesome flies.

HORSE-MEDICINES, an appellation given to such drugs as are prepared exclusively for the use of horses, in particular disorders. As many accidents happen from the ignorance of pretenders, we shall offer a few hints, together with recipes, that may be useful in ordinary cases.

I. Purges are frequently rendered necessary in full-grown horses of gross habits, for disorders of the stomach and liver; they ought, however, to be administered with great caution, and their strength proportioned to that of the animal; for, as these medicines frequently continue 22 hours in the body previously to passing off, they are apt to cause gripes, accompanied with excessive cold sweats, and to occasion inflammations, which frequently terminate in gangrene and death.

Purges ought to be given early in the morning, upon an empty stomach; three or four hours afterwards, the horse should be fed with scalded bran, when a little hay may be allowed him. All his drink ought to be lukewarm, and a little bran should be mixed with it; but, if he refuse this mesh, pure water may be given. While the dose is operating, the animal should swallow copious draughts of warm water; or, in case of refusal, be indulged with cold drink, in order that the purge may pass off the more speedily.

The following preparations are extracted from those, the character of which is established among sportsmen, for their utility on sudden emergencies.

1. Take from 10 to 12 drams of aloes; of myrrh and ginger, each half an ounce; of saffron half a dram; and a similar quantity of oil of amber: or,

2. Let 10 drams of Socotrine aloes; half an ounce of myrrh finely pulverized; one dram of saffron, and a similar quantity of fresh jalap, both in powder, be well mixed together, and formed into a solid ball, with the addition of syrup of roses, and a tea-spoonful of rectified oil of amber.

3. Infuse two ounces of senna in a point of boiling water, with three drams of salt of tartar, for two hours; when it is to be poured off, and four ounces of Glauber's salt dissolved in it, together with two or three ounces of cream of tartar.—This preparation is reputed to be cooling, easy, and speedy in its operation; it is preferable in cases of sudden inflammations to any other dose; as it is said to pass into the blood, and also to operate by urine.

The following cathartic balls are recommended by Mr. Taplin; and the ingredients of which they consist, are proportioned to the age, strength, size, and constitution of different horses.

1. Socotrine aloes, one ounce; India rhubarb, two drams; jalap and cream of tartar, each one dram; pulverized ginger, two scruples; essential oil of cloves, and aniseed, each twenty drops; and as much syrup of buckthorn as will form the whole into a ball.

2. Socotrine aloes, ten drams; rhubarb, jalap, and ginger, each two drams; cream of tartar, three drams; and a sufficient quantity of syrup of buckthorn, to form the ingredients into a ball.

3. Barbadoes aloes, nine drams; jalap, Castile soap, and cream of tartar, of each two drams; ground ginger, one dram; and the same proportion of syrup of buckthorn as above stated.

4. Barbadoes aloes, ten drams; Castile soap and jalap (in powder), of each half an ounce; cream of tartar and ginger, each two drams; oil of aniseed, forty drops; and twenty drops of oil of cloves. These are to be formed into a ball, either with syrup of roses or of buckthorn.

In preparing these balls, it will be requisite to give them an oval form; but, if they exceed the size of a small hen's egg, they ought to be divided into two doses, and dipped in oil, in order that they may pass the more easily down the horse's throat.

II. CLYSTERS are of considerable service, in relieving the animal from various acute complaints: hence they should be carefully administered, lukewarm. Their composition ought to be extremely simple, so that they may be easily prepared, and given on sudden emergencies.

Clysters are distinguished by various names, such as emollient, laxative, diuretic, &c. of these we shall specify such as may be speedily procured, together with the cases in which they may be resorted to with advantage.

1. *Laxative Clyster.* Let two or three quarts of thin water-gruel be mixed with eight ounces of Glauber's salt, to which are to be added, six ounces of sweet oil.

2. *Emollient Clyster.* Take two or three quarts of thin water-gruel, six ounces of coarse sugar, and a similar proportion of salad-oil. The whole is to be well mixed, and injected lukewarm.—These two preparations will be fully sufficient to promote a free discharge in sudden obstructions, inflammations, &c.; they are, in general, fully as efficacious as the more costly compounds.

3. *Purging Clyster.* Infuse two ounces of senna in boiling water; after having stood a sufficient time, it is to be strained, and four ounces of syrup of buckthorn, with an equal quantity of salad-oil, are to be carefully incorporated with it.—This will operate more speedily than either of the preceding mixtures, and is therefore preferable, when immediate discharges become necessary.

In case of sudden or apprehended inflammations in the bowels, the following is the most proper:

4. *Anodyne Clyster*: it consists of one pint of the jelly of starch, or infusion of linseed, and one ounce of liquid laudanum, properly mixed, and immediately administered: if the symptoms increase, from 30 to 40 grains of opium may be substituted for the laudanum, according to their urgency.

5. *Nourishing Clyster.* Three quarts of thick water-gruel, with two or three table-spoonfuls of honey.—When clysters of this kind become necessary, they ought to be given four, or even five times in the course of a day, as circumstances may require. They are very serviceable in cases of locked jaw, inflammations of the throat, &c.

6. *Diuretic Clyster.* Take Venice turpentine, two ounces; Castile soap, one ounce. These are to be well beaten up with the yolk of two eggs, and then diluted with two quarts of warm water. Such a clyster is of great service in the strangury, and all obstructions of the urinary passages: if speedily administered, it seldom fails to afford complete relief.

These few clysters are amply sufficient for common exigencies; and, with a few alterations, which every skilful person is able to adopt, will answer almost every purpose.

III. POULTICES are of such utility, as to deserve a place in this collection. We shall, therefore, subjoin two preparations which may be safely applied in cases of accidental wounds.

1. *Digestive Poultice*: Take such a quantity of oat-meal or coarse wheaten flour, and beer-grounds, as may be required on the occasion: with these are to be mixed common turpentine and hog's-lard, one ounce of each, previously melted together, and the whole boiled to the consistence of a poultice.

2. *Emollient Poultice*: Take half a pound of oat-meal, or coarse wheaten flour, and a similar quantity of pulverized linseed. These are to be boiled in milk or water, to the consistence of a cataplasm, when one ounce of sal-ammoniac in powder should be added.—The emollient poultice may be applied to wounds attended with great heat, inflammation, or swelling: by the addition of fresh butter, lard, or oil, it may be rendered more relaxing, so that it will speedily remove the tension of the skin, while it attenuates the viscid and obstructed juices.

IV. POWDERS. The chief powder employed in farriery is that of *Dia-pente*; which consists of equal quantities of gentian, barberries, myrrh, the shavings of ivory, and round birthwort (*Aristolochia rotunda*, L.)—These are to be carefully pulverized, sifted, and weighed, so that the exact proportions be mixed; after which they are to be kept perfectly secluded from the air. This powder generally forms an ingredient in other medicines, and is of considerable efficacy in the FARCY (which see): it is likewise mixed with muscadine wine, sack, or ale, and given as a kind of diet-drink to horses affected with colds, coughs, inflammations in the blood or liver, and various other affections; as it tends to purify the humours, and to clear the bowels of infectious or corrupt matter. The last class of medicines that deserve attention, are:

V. DIET DRINKS, which are generally used in cases of surfeits, or similar disorders; for this purpose, the following recipes may be useful:

1. *Lime-water*, prepared with shavings of sassafras and liquorice, is well calculated to purify the blood, and may occasionally be given, together with balls consisting of pulverized salt-petre, mixed with honey; so that two or three ounces of nitre be taken in the course of twenty-four hours.

2. *Tar-water* may in many cases, and especially when the appetite is impaired, be administered with advantage; but let it be remembered, that all medicines of this nature ought to be continued for a considerable time, in obstinate maladies; for, otherwise, there will be no chance of success.

Lastly, as many diseases of the horse arise from obstructed perspiration, in consequence of his being suffered to stand in the stable, and become cool after fatiguing labour; we can from experience recommend a mesh, consisting of two or three gallons of lukewarm water, in which half a pound of honey is dissolved, with the addition of a few handfuls of barley meal, or malt dust: such a draught ought to be allowed morning and evening,

ing, for several days, whenever it is apprehended that the animal has taken cold, or been otherwise injured by violent exertions.

HORSE-RADISH, or *Cochlearia Armoracia*, L. an indigenous perennial plant, growing on the sides of ditches, the banks of rivers, and other damp places; flowering in the month of May.

It has a strong pungent smell; a penetrating acrid taste; and is refused by every kind of cattle.—The root, when scraped, is much used at the table as a condiment for fish, roast beef, &c.; it is also employed for many other culinary purposes; and might, in times of scarcity, afford flour for bread. With this intention, however, the roots ought to be collected in autumn, and treated in the manner already described, vol. i. pp. 447 and 513.—But, if horse-radish be intended for immediate use, it ought to be dug out of the ground *fresh*, only from October to March; or to be gathered in the spring, then dried, reduced to powder, and preserved in bottles closely stopped, for occasional use; when it should be previously moistened with spring water.—When steeped and digested in vinegar, during a fortnight, this root is said effectually to remove freckles in the face.

In paralytic complaints, horse-radish has sometimes been applied, with advantage, as a stimulating remedy to the parts affected.—A strong infusion of it excites vomiting; and is greatly recommended by SYDENHAM in dropsies, particularly such as succeed intermittent fevers.—Prof. BECKMANN mentions this vegetable among the most proper substances for tanning or currying leather.

HORSE-SHOE-HEAD, an affection of the heads of infants, in which the sutures of the skull are too open, or too great a space occurs between them; so that the aperture is frequently not closed, or the cranium in that part does not become hard and firm, till the age of puberty. This opening increases as often as the child takes cold; and, if it continue for a long series of years, it is generally regarded as a sign of weakness, or short life. In this case, the usual practice is to rub the head occasionally with warm rum or brandy, mixed with the white of an egg, or a little palm-oil: it will also be advisable to wear a small cushion over such aperture, by which it will not only be protected from the cold air, but likewise from receiving sudden injury; and consequently the closing of it will be promoted. Such infants ought to be watched with additional care, to prevent any accidental falls, or blows, on the head, which to them would be fatal.—See also FOOD.

HORSE-TAIL, or *Equisetum*, L. a genus of perennial plants, comprising eight species, six of which are indigenous: of these, the following are the principal:

1. The *sylvaticum*, or Wood-horse-tail, which grows in moist woods, shady places in the vicinity of rivers, and on boggy soils: it flowers in the months of April and May. Horses eat this plant with avidity; and, in some parts of Sweden, it is collected for the purpose of serving them as winter-food.

2. The *arvense*, Common, or Corn-horse-tail, growing in wet meadows and moist corn-fields. It is a most troublesome weed in pastures, and is seldom touched by cows, unless pressed by hunger, when

when it occasions an incurable diarrhœa: it is eaten with impunity by horses; but is noxious to sheep. This rough grass is employed for cleaning and polishing tin vessels. According to GLEDITSCH, this species, as well as the *fluviatile*, or River-horse-tail, are of considerable service in tanning or dressing leather.

3. The *palustre*, Marsh-horse-tail, or Paddock-pipe, which flourishes in marshy and watery places; flowers in the months of June and July. It is not so strong as the preceding species, but is equally prejudicial to cows: farther, it is very troublesome in drains, *within* which it vegetates, and forms both stems and roots, several yards in length: thus the course of the water is interrupted, and the drains are totally obstructed. To remedy this inconvenience, the reader will consult p. 165 of this volume, the article DRAINING.

4. The *hyemale*, Rough Horse-tail, Shave-grass, Pewterwort, or Dutch Rushes, is found in marshy, watery soils, and flowers in the months of July and August. This species is wholesome for horses, by which it is eaten; but it is hurtful to cows, and disagreeable to sheep. It is chiefly employed by turners and cabinet-makers, for polishing their work; as well as by dairy-maids, for cleaning pails and other wooden utensils.

HORSE-WORM. See BOTTS.

HOSPITAL, a building properly endowed, or otherwise maintained by voluntary contributions, for the reception and support of the poor, sick, infirm, or helpless.

Few countries abound with a greater number of these humane institutions than Britain; yet they are often calculated to generate disease rather than to cure it, on account of their crowded wards, or from their confined situation in populous cities, where the most pestilential vapours are in a manner condensed; and thus, in too many instances, the victims of poverty, age, infirmity, or sickness, eventually perish by mutual contagion.

Much, we are convinced, has already been done towards remedying an evil of so serious a nature; but still more remains to be accomplished, before salutary changes produce the desired effect in this neglected department of medical police. We mention these few circumstances, in order to excite a greater degree of attention to this important object, in which the salubrity of the metropolis is particularly concerned. Those of our benevolent readers who wish to acquire further information, ought to read the *Extracts from an Account of the Institution for the Cure and Prevention of Contagious Fevers in London*, lately published; as well as Mr. AIKIN's *Thoughts on Hospitals* (8vo. 1s. 6d. Johnson, 1771): both pamphlets equally abound with interesting facts and observations.

HOT-BEDS, in gardening, are made either with fresh horse-dung or tanners' bark, and covered with glasses, to protect them from the severity of the wind and weather.

Where horse-dung is employed, a trench should be dug, of a width and depth proportioned to the size of the frames intended to be used; and which, in dry ground, ought to be a foot, or a foot and a half, deep; but, if the soil be wet, it should not exceed six inches. The dung is then to be spread even and smooth on every part of the bed, laying the finer manure on the surface: if the bed be intended for planting out cucumbers, a hole should be made, about ten inches broad, and six inches deep, in the middle of the place destined for each light, and then filled up with good fresh earth. The bed is next to be covered, to the depth of four inches, with the earth taken out of the trench, and the frame fixed over it, to remain till the earth become warm, which commonly takes place in the course of 3 or 4 days after the bed is made; when the cucumbers may be planted.

In case the hot-bed be designed for other plants, it will not be necessary to make holes in the dung; but, after levelling the surface, good earth ought to be spread over it, to the depth of three or four inches; the frames and glasses being put on as before. In making such beds, the dung should be settled close with a fork; and if it be full of long litter, it must be trod down equally in every part. In the first week, or ten days, after the hot-bed is made, the glasses should be slightly covered during the night, and cautiously opened in the day time, to give vent to the steam; but, as soon as the heat abates, the covering should be increased by mats or straw; and, when the bed becomes cold, fresh dung should be applied to its sides.

Hot-beds made with tanners' bark are preferable to those above described, especially for tender exotic plants and fruits; as they require a more equal warmth than can be produced by horse-dung. The method of making them is as follows: a trench is dug about three feet deep, if the ground be dry; but, if the soil be wet, it ought not to exceed the depth of a foot, and should be raised two feet above the ground. Their size must be in proportion to the frames intended to cover them; though they ought to extend at least 10 or 12 feet in length, and six feet in width. The trench should be lined with bricks on each side, to the height of three feet, and filled in the spring with fresh tanners' bark, which should be previously thrown up into a round heap, in order to drain for three or four days. When the tan is laid on, it ought to be gently beaten down with a dung-fork; for, if it be trodden in, it will be prevented from heating, as it settles too close. The frame and glasses are now to be fixed; and, in the course of ten days or a fortnight, the bed will grow hot, when pots or plants of seed may be plunged in it; care being taken that the bark be not compressed. These beds will preserve a proper temperature of heat for three or four months, which may be continued two or three months longer, by adding a load or two of fresh bark, as often as the warmth begins to decrease.

Frames vary in size, according to the plants they are destined to cover. If designed for ananas or pine-apples, the back should be three feet high, the lower part fifteen inches: when the bed is intended for taller plants, the frame must be made proportionally higher; if for seeds only, it will not be necessary to employ frames more than fourteen inches in height at the back, and seven in the front. Thus, the heat will be increased, and the growth of the plants considerably promoted.

HOT-HOUSE, a building erected for the purpose of raising such exotic plants, as, from their extreme tenderness, are unable to withstand the effects of a cold or variable climate.

The construction of hot-houses, in general, differs little from that of GREEN-HOUSES; because the design of both is to receive as much benefit as possible from the genial warmth of the sun, assisted by the heat artificially procured from subterraneous stoves and flues.—We shall, therefore, at present, only give an analysis (from the 1st. vol. of the second series of *Recreations in Agriculture*, &c.) of the principle on which Dr. ANDERSON's improved hot-houses are constructed, and for which he has lately obtained a patent.

He first points out the defects in the present method of erecting hot-houses; in consequence of which the heat of the sun is not employed with that advantage of which it is susceptible. In the prevailing mode of building these houses, the roof glasses are, with very few exceptions, laid into the frames, by folding one frame over the other, and thus leaving an open space between each pane; through which the air has a free passage, while the front panes are closely covered round with putty. This communication with the open air at the upper part of the house, is their chief imperfection; for the power of the morning sun is thus lost for several hours; and, in the evening, when the warm air within begins to cool and to contract in bulk, the cold air from *without* rushes in through the top or roof-glasses, cools the whole house in the most expeditious manner, and thus counteracts the influence of the solar rays.

To remedy these inconveniencies, the patentee proposes the following plan of construction, for houses designed to force vines, or such plants as require a similar temperature. The house is to be built of the usual dimensions, but with a glass roof perfectly flat; and, as it never requires to be opened, all the seams or junctures between each pane are to be carefully closed with lead and putty. Over this flat ceiling, another sloping roof is to be erected, and covered either with slate, or likewise with glass, which will better answer the purpose. The upper chamber, which will thus serve as a reservoir for the heated air, communicates with the common atmosphere only at its lower part, that is immediately over the roof of the lower house; and there is a contrivance for another occasional communication with the latter, by means of a pipe or tube, that extends from the top of the upper chamber, almost to the ground below.

By this construction, as soon as the sun expands the air in the lower house or chamber, a part of that air rises through the tube into the upper chamber; where it ascends to the top or roof, forcing out the cooler air contained in the upper chamber, which passes off through the openings left above the floor of this chamber, or in the roof of the lower room.

During the whole of this heating process, the vines, which are trained along, beneath the glass roof of the lower chamber, are surrounded with heated air. In the evening, when the influence of the sun is withdrawn, the warm air begins to cool, and consequently to contract its bulk; thus the external air rushes in, through the aperture immediately over the lower glass roof, into the upper chamber. This cold air being heavier than that within the house, it can only enter as the latter recedes; the current through both chambers is now exactly reversed: and the lower room receives all the warm air from the reservoir or upper one, before the cold can reach it.

Dr. Anderson is of opinion, that a few hours sun-shine will at any time be sufficient completely to heat the house in which vines are planted; and thus, without any artificial heat from fuel, a permanent warmth may be maintained, which is sufficient to ripen grapes, in favourable weather, as early as in the months of June, July, and August. He farther suggests that the upper chamber may be converted into an hot-house of inferior rank; and that it would be eminently calculated to serve as a substitute for a green-house or conservatory.

Such is the outline of this very ingenious plan, and the inquisitive reader who wishes to acquire more minute information on this subject, will probably resort to the volume already quoted, where it is amply treated, and illustrated with cuts.

Hot-houses are liable to be infested with a variety of insects known under the different appellations of *Cocci*, *Aphides* (lice), &c. that harbour in the walls, and among the trellises, which fasten up vines, and other wall-fruit trees, especially during the winter. In order to destroy these vermin, Mr. Speechley recommends the walls to be washed with common *soap-suds*, early in the spring, while they are in a torpid state: this liquor is to be poured out of a watering-pot from the top of the wall downwards; and ought, when used, to be considerably warmer than new milk: thus, if the suds be properly and plentifully applied, the wall will assume a pale red colour, and the insects be effectually destroyed.

HOUND, an appellation given to dogs of chace.

Hounds of the middle kind are deemed to be the best, being stronger than such as are either very small, or of a large size.—The shape of these animals should be carefully attended to, as they can neither run swift, nor perform great tasks, if their limbs are not well proportioned. A good hound ought to have straight legs, round small feet, and well-formed shoulders; his breast should be rather wide than narrow; his chest deep; his back broad; his head small; his neck thin; his tail thick and bushy. Young animals that are weak from the knee to the foot, should not be suffered in the pack; and all the hounds should be nearly of a size.

Particular attention is requisite in the breeding of hounds. No old dogs should be admitted, nor should any attempts be made to cross the breed. The months of January, February, and March, are the best for breeding.—As, however, this quadruped is less connected with purposes of economy than amusement, we shall content ourselves with referring the curious reader to Mr. Beckford's "*Thoughts on Hunting*," (4to. 10s. 6d.) in which the subject is fully and perspicuously treated.

Hound's-berry. See Cornel-tree.

HOUND's-TONGUE, or *Cynoglossum*, L. a genus of plants consisting of eight species, two of which are natives of Britain: the principal of these is the *officinale*,

nale, Common Great Hound's-tongue, or Dog's-tongue, which is frequently found on road sides, and among rubbish; where it flowers in June.—It is eaten by goats, but refused by sheep, horses, hogs, and cows.—Its scent is very disagreeable, and resembles the odour of mice.

This plant has a bitter taste, and is so powerfully narcotic, that persons who had eaten it as a culinary vegetable, were laid into a profound sleep for fourteen hours; and others died in consequence. The roots, however, were, according to RAY, employed by Dr. HULSE, who prescribed a decoction of them internally, and cataplasms externally in scrophulous cases. The leaves and roots have likewise been recommended for the same purposes, and also for coughs, dysenteries, &c. on account of their mucilaginous, astringent, and sedative qualities, of which we have had no experience.

HOUND'S-TREE. See CORNEL-TREE.

HOUR, a measure of time, equal to the 24th part of the natural day, or that space of time which the earth requires to perform its diurnal revolution round its axis. The hour is divided into 60 minutes, each of which is divided into 60 seconds, as every second is into 60 thirds.—See TIME, and WATCH.

HOUR-GLASS, a kind of chronometer, employed by navigators, as well as by some artisans and mechanics, to measure the passing of time, by means of the descent or running of sand, out of one glass into another.

The best hour-glasses are those which are filled with egg-shells, well dried in an oven, finely pulverized, and sifted; as they shew the passing of time with greater exactness than common sand.

HOUSE, a habitation or edifice suited with conveniencies for the abode of man.

The chief requisites in constructing houses are, situation, durability, and convenience, of which we have already treated under the article BUILDING; we shall therefore only notice an expired patent granted in 1786 to Mr. DENNIS M'CARTHY, for his then new-invented compound, applicable to the formation of tiles.

The patentee directs three bushels of Thames sand, or any white *fluxing* sand, to be mixed with a bushel of salt, and calcined in a kiln or furnace till it become a hard substance. These ingredients are then to be ground fine, and one bushel of them mixed with an equal quantity of white clay, or whiting, to which are to be added one bushel of calcined ground flint, or ground glass; plaster of Paris may also be mingled with the clay, if the latter article cannot be easily procured; and, by the addition of smalt, the compound may be made of a beautiful slate colour.

When the ingredients are mixed together, and moistened with water, they should be worked till they acquire a consistence proper for casting them into moulds. The pieces, or tiles thus formed, are next to be burned in a furnace, or kiln, the fire being confined by funnels or muffles. The size of these tiles depends on the distance of the rafters, on which they are to be placed in such a direction, that the joints may meet in the centre, and either fold over, or fix into each other exactly; in which state they are to be fastened by pegs, screws, spikes, &c. when the joints are to be closed with stone cement, tarras, or fine mortar.—A more particular account of this invention will be found in the 11th vol. of the *Repertory of Arts and Manufactures*, where it is fully specified.

HOUSE-LEEK, or *Sempervivum*, L. a genus of perennial plants, consisting of 13 species, one of which, the *Sempervivum tectorum*, Common House-leek, or Cyphel, is a native of Britain; it grows on the roofs of houses and old walls, where it flowers in the month of July.

This plant is eaten by sheep and goats: its juice, when mixed with honey, is said to be of considerable service in aphthous cases, or the thrush of children; it also affords immediate relief, whether applied by itself, or mixed with cream, in burns and other external inflammations.

Hoven, or *blown Cattle.* See vol. i. p. 464.

Hover, or Haver. See Bearded Wild Oats.

HUNGER, an uneasy sensation, occasioned by long abstinence from food, when the body is in a state of perfect health.

Without attempting to specify the different preparations used by the ancients, for the *prevention* of hunger, we shall merely communicate such substitutes as have been judiciously recommended on sudden emergencies; together with the most proper means of administering food to persons who have for a considerable time been deprived of aliment.

In times of distress, life may be protracted with less pain and misery, by a moderate allowance of water; because that fluid counteracts the acrimony and putrid tendency of the humours, while it furnishes the lungs with the degree of moisture essentially requisite to the performance of their functions. It is, however, a matter of serious consequence to such as are exposed to this dreadful calamity, to be provided with the means of alleviating its horrors, when about to undertake a long journey, in which they are apprehensive of a scarcity of provisions.

The American Indians are supposed to use a preparation consisting of the juice of tobacco, and the shells of oysters, snails, or cockles, burnt so as to be reduced to the finest powder. These ingredients are dried, and formed into lozenges of a proper size to be held between the gum and the lip, so that, being gradually dissolved, they obtund or mitigate the sensations both of hunger and thirst.

A more palatable and efficacious substitute for food, however, in a famishing situation at sea, is the powder of *salep*, which has been judiciously suggested by Dr. Lind, in order that it may form part of the provisions of every ship's company. This powder, together with *portable soup*, when dissolved in boiling water, forms a rich thick jelly, and *one* ounce of each article will furnish a whole day's subsistence for an adult. Indeed, from the experiments made on salep, by Dr. Percival, it appears to contain a larger quantity of nutritious aliment, in proportion to its bulk, than any other vegetable matter hitherto known as food. It also possesses the valuable property of suppressing the nauseous taste of salt water; and may thus be of great utility at sea, when fresh water is either wholly, or so far consumed,

sumed, that the mariners are "put upon short allowance." From the same mucilaginous property, it greatly tends to counteract the acrimony of both salted and tainted meat. When provisions are nearly exhausted, the most beneficial method of using salep in distressing circumstances will be, to mix it with an equal quantity of beef-suet, and form the whole into little balls. By swallowing this composition, at proper intervals, the coats of the stomach will be defended from irritation: and, these balls, like other oily and mucilaginous matters, being highly nutritive, and slowly digested, small portions are well calculated to support life, and thus to form an efficacious preservative against the most dreadful calamity that can possibly happen to mankind. Gum arabic is likewise a good substitute for, or addition to, salep, in the preparation above-mentioned; and, as it renders the whole mass more solid, it will require a degree of mastication, by which the saliva is separated and conveyed into the stomach; while it contributes to assuage the pains, both of hunger and of thirst.

In attempting the restoration of those unfortunate persons who have endured the horrors of famine, we recommend the utmost precaution. Warmth, cordials, and the most nourishing broths, or jellies, are to be administered gradually, and with great circumspection; for otherwise, even these might prove fatal. The most judicious mode of communicating warmth to the exhausted patient, will be to place a healthy person on each side in contact with him. Bathing the feet in warm water, and fomentations, may be advantageously employed; but their temperature ought to be lower than that of the human body, and imperceptibly increased. New milk, weak broth, or water-gruel, may be used for both purposes, as well as in repeated clysters; because nourishment may, in this manner, be effectually conveyed into the body by different passages, which are most pervious during a state of long abstinence; provided the means of relief have not been too long delayed.—Cordials should at first be given in very small doses, and much diluted: one of the best preparations is white-wine whey, which affords both a gentle stimulus and easy nutriment. When the patient's stomach acquires a little strength, a new-laid egg may be mixed with the whey, or given in some other form that may be more agreeable to his palate. Thus, he may progressively return to a more substantial diet; so that, by proper care and cheerful society, he will in a short time be restored to health.

HUNTING, the exercise, or diversion of pursuing wild quadrupeds, whether those of game or prey.

Hunting has at all times been a favourite amusement, as well among the rudest, as the most polished nations. Much, however, has been said both for and against the continuance of this practice. The late FREDERIC the Great, of Prussia, never joined in the chace.—Where wild, or noxious animals abound, or where the object of hunting is to procure the necessary supply of food, the chace is doubtless justifiable. But, when it is attended with such mischief as is often the case in highly cultivated districts, we conceive, it ought to be gradually abolished.—Nor should it be urged by professional sportsmen, that, without being chased, wild animals would multiply in such numbers as to become dangerous to man and cattle. This plea, however specious, is not conclusive; because we are in possession of various methods by which animals of prey might be entrapped, taken, or otherwise exterminated, without any danger or inconvenience to the huntsmen. But, while this amusement is restrained within due bounds, and not carried to such extremes as are, or at least were, till lately, practised in France and Germany, we hesitate to pronounce unqualified censure; especially as it frequently contributes to the health and vivacity of its votaries.

HURR-BUR. See BURDOCK.

HURTLE-BERRIES. See BILBERRIES.

HURT-SICKLE. See Corn BLUE-BOTTLE.

HUSBANDRY, strictly speaking, comprehends the whole business of a farmer, or a man who maintains himself and family by cultivating the earth.

In this light, husbandry includes not only agriculture, but several other branches connected with it. Of this description are the rearing of cattle; the management of the dairy, or the making of butter and cheese; the treatment of bees; the raising of flax, timber, hops, &c. To these may be added horticulture, as far as it respects orchards, and the making of cyder and perry; the domestic economy of the farm-house, and various other objects, of which we treat in their respective order of the alphabet.

Such are the numerous branches which demand the husbandman's attention; and so complicated indeed are they, as to call forth every exertion and ingenuity, for the purpose of facilitating the different operations, and to promote their more or less important objects. Hence various societies, both public and private, have been instituted; which, by judicious premiums, and other modes of encouragement, have advanced this interesting science perhaps to the highest degree of perfection of which it is susceptible, if the occasional difference of opinion were ultimately settled. We shall, therefore, subjoin a list of such works as will amply repay the time and attention which may be spent in perusing them, and which reflect lustre and credit on the country in which they have been published.

The *Communications to the Board of Agriculture*, and the *Transactions of the Society for the Encouragement of Arts*, &c. possess the first place in the scale of merit. With these may also be classed the *Letters and Papers of the Bath and West of England Society*, and Mr. A. YOUNG'S *Annals of Agriculture*; works which have been carried on for a series of years, and which progressively become more interesting and useful.

Beside these collective and national works, there have lately appeared various detached treatises, relative to the principal branches of husbandry, the perusal of which cannot fail to be attended with considerable advantage. Among these are, 1. Lord SOMERVILLE'S *System followed during the two last Years, by the Board of Agriculture*, &c. (8vo. pp. 300. 2d edit. Miller, 1800); a work replete with information and philanthropic proposals—2. Dr. ANDERSON'S *Essays on Agriculture* (8vo. 3 vols.

1l. 7s.)—3. The same practical writer's *Recreations in Agriculture*, of which five volumes have been already published—4. Mr. ELLIS's *Husbandry abridged and methodized* (8vo. 2 vols. 10s. 6d.)—5. Mr. HARTE's *Essays in Husbandry* (8vo. 5s. 6d.)—6. Mr. PARKINSON's *Experienced Farmer* (2 vols. 8vo. Robinsons, 1798); a work containing a variety of useful hints and directions.—Much valuable information may also be collected from the *New Farmer's Calendar* (8vo. pp. 619. 9s. Symonds, 1800); and likewise from Mr. BANISTER's *Synopsis of Husbandry* (8vo. pp. 471. 7s. Robinsons, 1799), which last-mentioned work is obviously written by a man of experience.

There are many other works of merit published by English writers on agriculture; but, as our narrow limits will not permit us to specify them, we cannot conclude this article better than in the words of the excellent Lord SOMERVILLE, whose name we have frequently cited: "Economy (says this enlightened nobleman) is the life and soul of husbandry: when we lost sight of it, plenty deserted us; and unless it be speedily recurred to, she will not return. May that period, when of necessity we must put in execution some plan for the relief of our poor, be far from us! May vigorous and economical husbandry prevail throughout the kingdom, *without the aid of legislative interference!*"

HYACINTH, or *Hyacinthus*, L. a genus of perennial plants, comprising 16 species, one of which is indigenous; namely, the *non-scriptus*, English Hyacinth, or Harebell Hyacinth *(Scilla nutans*, or Wild Hyacinth of Dr. SMITH): it grows in woods and hedges, where it flowers in the month of May. The fresh roots of this plant are poisonous; but it appears from experiments, that they may be advantageously converted into *starch*.

The most admired of the exotic species is the *Orientalis*, or Eastern Hyacinth, which is cultivated to a great extent, and with success, by the florists of Holland, whence it has been lately imported. It is one of the most odoriferous flowers, and has several hundred varieties, the price of which is from three-pence to 20l. or 30l. per root!

The hyacinth is a hardy plant, and will prosper in any soil, though the more delicate varieties require to be sheltered during the severity of winter. They may be propagated either from the seed, or by planting off-sets from the roots, in autumn; in which latter case the bulbs ought to be previously cleaned and dried.

HYDROCEPHALUS. See WATER *in the head*.

HYDROMETER, an useful instrument for measuring the gravity, density, strength, &c. of spirits, or other liquids.

For this purpose, various hydrometers have been contrived on different principles; but the most simple of which appears to be that devised by Mr. WILLIAM JONES, mathematical instrument-maker, Holborn. It requires only *three* weights to discover the strength of spirits, from alkohol down to water, and is adjusted to the temperate state of the air, or to 60° of FAHRENHEIT's thermometer. Farther, as an alteration of this temperature has a very material effect on the gravity of spirits, by causing them to appear much stronger during warm weather, and the reverse in in cold seasons, it was formerly requisite to place a thermometer in the spirits, previously to immersing the hydrometer, and to make a certain, but inaccurate, allowance for the several degrees the mercury may be above, or below, the temperature before mentioned. In order to remedy this inconvenience, Mr. JONES has contrived to unite the thermometer with his instrument; and, from experiment, to adapt the divisions to the different degrees above or below the temperate state. Thus, his hydrometer is rendered easy in its application, and sufficiently accurate for the common purposes of distillers, or dealers in spirits.

HYDROPHOBIA. See BITE *of a Mad Dog*.

HYKES, a species of blankets, commonly used by the inhabitants of Barbary. They consist of a light woollen cloth, woven by women, who conduct every thread with their fingers, and without the aid of a shuttle. This manufacture appears to be a coarse kind of shawl, and is the more remarkable, as each of such hykes is from five to six yards in length, and breadth; it forms the whole apparel of the wretched natives, and serves them as a covering for their beds during the night.

HYPOCHONDRIAC AFFECTION, or *Hypochondriasis*, may be defined to consist in a corrupted state of the stomach and intestines, accompanied with languor, dejection of mind, and fear, arising from insufficient reasons, in persons of a melancholy disposition.

Among the numerous causes contributing to generate this tormenting affection, the most frequent are, acrimony of the bile; plethora; a preternatural viscidity, or stagnation of the blood; and suppressions of the customary evacuations. To these may be added an hereditary disposition; too free indulgence in wine; repelled eruptions; violent passions of the mind, &c.

Few persons of a sedentary life are entirely free from this complaint; which, if neglected, is more troublesome than dangerous; but if it be improperly treated, it may occasion various diseases of a more fatal tendency, such as melancholy, jaundice, palsy, apoplexy, &c.

The cure or removal of hypochondriasis must be attempted by those medicines which are calculated to counteract occasional causes, and obviate the more urgent symptoms: hence gentle laxatives, acidulated and chalybeate waters, as also copious draughts of cold water, have often been productive of the best effects. Emollients, diluents, the cold-bath, Peruvian bark, and exercise, especially riding on horseback, if judiciously resorted to, have all been found of service.

Hypochondriac patients ought never to fast long; their diet should be solid and nourishing; they ought carefully to avoid all acescent and flatulent vegetables. One of their principal objects, however, ought to be that of preserving the mind constantly in a cheerful and serene state. Nor should they neglect to rub, if possible, the whole body, every morning and evening, for ten minutes, or longer, with coarse flannel cloths.—Where the patient's circumstances can support the expence, a voyage to a warmer climate will be of greater advantage than medicines; though a rigorous adherence to a proper diet and regimen, at home, may also restore his health, and more certainly than luxury and dissipation abroad.

HYSSOP, or *Hyssopus*, L. a genus of exotic plants, comprising three species, the principal of which is the *officinalis*, or Common Hyssop. It grows to the height of 18 inches; is a very hardy plant, and may be propagated either by slips or cuttings, or by seeds. The leaves have an aromatic smell, and a warm pungent taste: they are particularly recommended in humoural asthmas, coughs, and other disorders of the breast and lungs; being supposed powerfully to promote expectoration.—According to RAY, these leaves are of great service when applied in cataplasms to bruises, the pain of which they speedily mitigate, and at the same time disperse every mark, or spot, from the part affected.

HYSTERICS, a spasmodic or convulsive disease, to which females chiefly are subject. It attacks them at uncertain intervals, and is usually preceded by a languor and debility of the whole frame. There is a violent pain in the head; the eyes become dim, and shed involuntary tears: a sensation is felt similar to that of a globe rising from the lower part of the abdomen to the stomach; and, at length, it reaches the throat, where it produces a sense of suffocation, a difficulty both of breathing and swallowing, while it is accompanied with great pains in the lower belly.

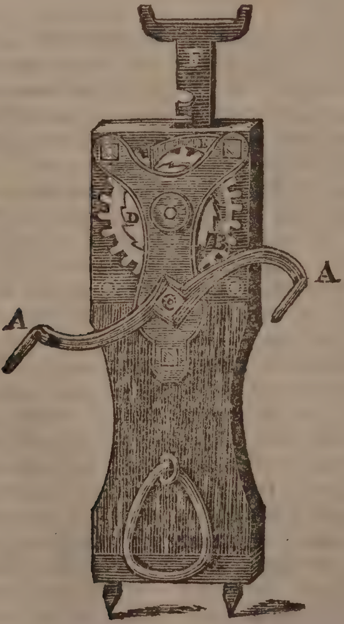
The general cause of hysterics is supposed to consist in too great a degree of mobility and irritability of the nervous system: whatever tends to enervate the body, may induce this complaint. Such are excessive heat, cold, terror, fear, grief, rage, acrid humours, ill smells, scorbutic affections, and glandular obstructions. Hence it chiefly attacks females of weak, relaxed habits, though a few instances have occurred, in which men have also been affected.

Notwithstanding the very alarming nature of this disorder, it seldom terminates fatally, unless from erroneous treatment. It, however, admits only of palliation, as it has but in few instances been completely removed. The chief object is to counteract or prevent the peculiar convulsive affection which immediately precedes the attack. And though we are in possession of a remedy, sufficiently powerful to effect that desirable purpose, yet great circumspection is required in its use; as, otherwise, the consequences might be more distressing than the disease. This medicine is *laudanum*; which, judiciously administered, checks the most violent paroxysms for a considerable time, but cannot accomplish a cure. Hence asa-fœtida may be given with greater advantage, though it disagrees with some persons, and occasions pain in the stomach and vomiting. Ipecacuanha, taken frequently in small doses, has sometimes been attended with success. To these may be added electricity, Peruvian bark, fetid matters presented to the organ of smell, such as burning feathers, or the smoke of sulphur, and the application of æther, strong volatile alkali, or other pungent matters to the nostrils. Relief has also been obtained by the sudden affusion of cold water on the face and hands, but more frequently from the application of warm water, especially to the feet and legs.—In order to effect a radical cure, it will be requisite to resort to chalybeates, mineral waters, or other tonics, and especially to the cold bath, where the constitution can support it. The diet of hysteric patients ought to be light and nourishing; they should carefully avoid whatever tends to relax the bowels or debilitate the system. Gentle exercise, and cheerful society, ought by no means to be neglected. Thus, by proper attention, this painful malady may possibly in the course of time be removed; or at least so far palliated, that its attacks will be less frequent and violent.

I. and J.

JACK, a well-known machine for raising timber, or other ponderous bodies.

Although numerous accidents almost daily happen in using the common jacks, for want of a contrivance to prevent the machine from taking a retrograde course, if the weight should, from any circumstance, overbalance the power, no attempts have till lately been made, to protect the workmen on such occasions. In order, therefore, to supply this deficiency in mechanics, as far as our opportunities will admit, we offer the annexed cut to the consideration of those readers who are not yet acquainted with the improvement it represents.



This machine was, in the year 1794, presented to the Society for the Encouragement of Arts, &c. by Mr. Mocock, of Southwark, for which he was rewarded with a premium of 20 guineas.

Description of the Cut of Mr. Mocock's *Improved Machine for raising large weights.*

A A, are the double handles of the winch.

B, represents the large toothed wheel, in which the pinion on the axis C works.

D, a ratchet-wheel.

E, the click, or pall, which falls into the teeth of the ratchet, and thus prevents the machine from running back, in case the weight should at any time overcome the power.

F, the rack, as appears in jacks of the common construction.

From a comparison of Mr. Mocock's jack with those in common use, the former differs from the latter only in one respect; namely, that, in the improved machine, a pall, or click, and ratchet, are applied in such a manner as to stop the machine in the case above mentioned, and thus to prevent those melancholy accidents which frequently occur, especially on board of ships engaged in action; when, from inattention, or neglect in fixing the hooks, or from any other cause, the common jacks fail: and, as the difference in its mechanism is not material, the improvement may be easily applied to the instruments already manufactured.

Jack-by-the-Hedge. See Garlic Hedge Mustard.

JACK-DAW, or *Corvus monedula*, L. a notorious bird, that is a native of Britain. It breeds in steeples, old castles, and on lofty rocks, where the females deposit five or six eggs.

The jack-daw is a gregarious bird, feeding on insects, seeds, and grain. It is equally mischievous in the fields as well as in the gardens, and is so prone to stealing, that it carries away more than is necessary for its subsistence. Hence various methods have been contrived for taking this depredrator: one of the most effectual is that practised in some parts of England, and which is so ingenious, that it deserves to be more generally known.

A stake, about five feet long, is first driven firmly into the ground; the upper point is previously made so sharp that no bird can possibly settle on it. Within a foot of the top is bored a hole, three quarters of an inch in diameter, through which a stick is put, about eight inches in length. A horse-hair noose is next fixed to a thin wand made of hazel, which is passed through the hole; the remainder being left open beneath the transverse stick. The other end of the hazel rod is then introduced into another hole in the stake near the ground, where it is fastened. The stake should now be placed in a situation which is frequented by the bird in quest of food, when he will consequently be induced to alight on it; but, on finding the point too sharp, he will probably settle on the little transverse stick: as this sinks with his weight, his leg will be effectually secured in the noose.

JALAP, in medicine, the root of the *Convolvulus Jalappa*, L. an exotic species of bindweed.

This root is imported in transverse slices from Xalapa, in South America. The best pieces are compact,

pact, hard, weighty, of a dark colour, and have black striated circles. It is frequently mixed with slices of bryony-root, which, however, may be easily distinguished by their paler colour and porous texture.

Jalap possesses no smell, and leaves very little taste upon the tongue; but, when swallowed, it affects the throat with a sense of heat, and occasions a plentiful discharge of saliva. It is advantageously employed in various disorders, but chiefly as a purgative; for which purpose from 15 to 30 grains, and upwards, are taken in powder: its action, in general, is mild, without causing nausea, or gripes, except in hot, bilious habits, and hypochondriacal cases: nor should it be indiscriminately given to children and young persons, whose bowels it relaxes, and at length destroys the appetite.

JAMES'S POWDERS. See FEVER-POWDERS.

JAPANNING, the art of varnishing and drawing figures on wood, in the manner practised by the inhabitants of Japan, and other parts of India. It may be applied to almost every substance that is dry and rigid; such as leather, metals, and even paper, previously adapted to the purpose.

If wood or metals are to be japanned, it is sufficient that their surface be smooth and clean; but leather requires to be carefully strained on frames, to prevent it from cracking, and consequently parting with the coats of varnish. Paper is managed in a similar manner, and is generally coated over with some kind of *size*. The japan is then laid on; but as this art is in the hands of extensive manufactures, and is, besides, too expensive to be practised for amusement, we shall only mention a patent which was lately granted to Mr. JOSEPH EYRE, of Sheffield, for a method of impressing japan upon the ornamented handles of knives, and other articles.—His process is very simple: as soon as the pattern is impressed on the handle, &c. it is taken out of the press (being previously marked, so that it may be replaced in the same situation); and the japan is laid on. The press is then heated to a certain degree, and the japanned article returned to it; by which means the varnish is pressed in, rendered more firm, and made capable of receiving a high polish. This method is applicable to ornamented handles of knives, forks, &c. made of wood or paper, in imitation of carved horn, or bone.—See VARNISH.

JASMINE, or JESSAMINE-TREE, *Jasminum*, L. a beautiful exotic plant, consisting of 9 species, three of which are reared in England, viz.

1. The *officinale*, or Common White Jasmine, with shrubby, slender, long stalks and branches, which grow, when supported, to the height of 15 or 20 feet: it has numerous white flowers, that blow at the extremities or points, and emit a very agreeable odour, especially in the evening.—The Italians prepare a fragrant oil from these flowers, by the following easy process: Cotton-wool is previously soaked in bonduc-oil *(Oleum Behen)*, which possesses no flavour whatever; a thin layer of such cotton is then placed in a glass vessel, and a stratum of flowers over it; another parcel of cotton is spread over the latter, and this alternate stratification repeated every day, till the oil is completely saturated with the grateful odour

of jessamine; when the whole is carefully expressed. It is worthy of notice, that neither spirits nor water will combine with this favourite perfume; and that there is no other method of fixing it than by means of vegetable oils.

2. The *fruticans*, or Shrubby Jasmine, which has long, shrubby, trailing stalks and branches, on the sides and ends of which appear yellow flowers, in the month of June. This species is remarkable for the numerous suckers which spring from its roots, and overspread the adjoining ground, if they be not annually taken up: its branches and leaves impart a fine citron colour to cloth previously immersed in alum-water; but solutions of tin and bismuth produce a much brighter shade.

3. The *humile*, or Dwarf Yellow Jasmine, has firm stalks, low bushy branches, and produces yellow flowers in the month of July. The whole plant yields a fine olive colour, if the wool or cloth be first prepared in a solution of green vitriol.

All these species thrive in our gardens, and are easily propagated by layers and cuttings; but they require a warm, and rather humid, soil. Beautiful shrubs may be produced, by inoculating the first species with that called *grandiflorum*, or the Great-flowered Catalonian Jasmine.

JAUNDICE, or *Icterus*, a disease in which the skin and eyes are yellow; the feces of a whitish colour; and the urine of a dark red hue, tinging cloth, or other substances immersed in it, of a yellowish shade.

Various causes produce this obstinate disease; such as a very diluted and acrid state of the bile; indurated swellings of the intestines; the colic, when occasioned by eating unripe fruit; accumulations of humours near the liver; suppression of the natural evacuations, &c. It may also arise from coarse and unwholsome food; as well as from the effects of fear, terror, anger, or any other passion; and likewise from suddenly drinking cold water, while the body is overheated.

Persons of a sedentary life and sanguine temperament, especially females, are liable to be attacked by the jaundice. Even infants become subject to the disease, if the breast be given them, while the mother is under the influence of passion.

The chief object, in curing the jaundice, is to remove the cause which occasions the accumulations of bile and humours at the liver; but, as it is very difficult to ascertain the precise nature and operation of that cause, various means ought to be employed, as circumstances may require. If, however, the jaundice arise from indurated swellings in the viscera, it is seldom curable; yet, as this symptom cannot always be discovered, the most judicious method will be that of treating the disorder conformably to the manner practised in calculous affections, or the stone; with a view to dissolve the concretions, and to prevent their future accumulation. For this purpose, gentle emetics should be frequently taken, and constant exercise on horseback; which, from their concussion of the viscera, dislodge the obstructing matter, and thus remove the complaint. But, if there be any tendency to inflammation, the patient ought to lose a little blood, previously to taking any emetics. Should, however, no relief be obtained after two or three vomits have been administered, it will be advisable to delay their repetition.

Honey, antiscorbutics, aromatics, bitters, blisters applied to the regions of the liver, have all been found serviceable in the cure of the jaundice. But, if these remedies fail, as in cases of scirrhous and glandular concretions, recourse can only be had to such medicines as may palliate the symptoms. Of this nature are *diuretics* (which see); though, if the pain or irritation of the skin be violent, opiates must be resorted to; and, if the blood has a tendency to dissolution, it must be counteracted by proper antiseptics, conjoined with the internal use of sal ammoniac. When the disorder was suspected to arise from a rheumatic cause, Dr. Selle successfully prescribed the sulphurated oil of turpentine, in combination with vitriolic æther; a powerful medicine, which has even expelled biliary concretions. Should it, however (as often happens), spontaneously disappear, it will be advisable to prevent its return, by a course of tonic remedies, and especially the Peruvian bark. The waters, of Harrogate, Bath, and Pyrmont, will also be found very serviceable; and, if the patient have no opportunity of bathing in them, affusions of common water may, according to Dr. Sims, be advantageously substituted.

The diet of persons affected with the jaundice, ought to be light, cool, and diluent; consisting chiefly of ripe fruits and mild vegetables: many have been effectually cured by living for several days on *raw eggs* alone. Butter-milk, whey sweetened with honey, or decoctions of marsh-mallow roots, and other aperient vegetables, ought to constitute the whole of their drink. Gentle and daily exercise in the open air ought by no means to be neglected; while the mind should be kept serene and cheerful.

Jaundice, in *horses*, a disorder which is by farriers usually called the *yellows*. It is divided into two species, the *yellow* and the *black*. In the former kind, the whites of the animal's eyes assume a yellowish cast; his tongue and his lips also partake of the same colour, though in a slighter degree. In the *black* jaundice, those parts are tinged with a blackish hue. The remedy commonly administered for the cure of this malady, consists of one ounce of *mithridate* (which see) dissolved in two quarts of strong beer, and given warm to the animal affected, once in twelve hours: by continuing these draughts for a few days, the distemper generally disappears.

The *jaundice* also attacks *sheep*, and imparts a yellowish cast to their skins. It may be cured, according to Prof. Bradley, by giving them internally some stale human urine, at frequent intervals.

JAW, or Jaw-bone, in anatomy, is the bone which contains the teeth within their sockets.

The jaw is liable to a variety of disorders, occasioned by colds or other accidents: the most fatal are, 1. The dislocated and fractured jaw, the treatment of which, being merely chirurgical, is foreign to our purpose; and, 2. the Locked Jaw, or *Trismus traumaticus*, which is a spasmodic rigidity chiefly of the under jaw.

This alarming complaint attacks persons of all ages, and is frequently fatal in the East and West Indies,

Indies. It is generally occasioned by sudden colds; wounds of the nerves, and nervous parts of the body, however slight; drawing of the teeth, and affections of the gullet or wind-pipe.—Suppression of the erysipelas or rose, hysterics, rheumatism, worms, and the bite of venomous serpents, are among the many causes of this dangerous disorder.

Opiates administered in large doses have, in some cases, been successfully employed; though the same medicine will also produce this malady. The warm bath, electricity, the free use of musk, oil of amber, and asa-fœtida, together with amputation of the wounded part, if there be the least symptom of mortification, have all been found of occasional service. In hot climates, Dr. LIND recommends immersion in cold water; and in the first volume of the *Transactions of the American Philosophical Society*, M. TALLMANN advises affusion of cold water on the body of the afflicted. During the continuance of this spasmodic disease, the patient can only receive sustenance through his teeth, or by means of nutritive clysters. His food ought, therefore, to consist of the most nourishing broths and jellies: thus, by the judicious application of the different remedies above stated, and by carefully avoiding to take cold, the locked jaw may probably be restored to its former situation, in the course of a few days.

JAY, or *Corvus glandarius*, L. a well-known British bird, remarkable for its beauty. It is about 13 inches in length; its forehead is white, streaked with black; the head is covered with a tuft of long feathers, which the bird erects at pleasure into the form of a crest: the whole neck, back, breast and belly, are of a faint purple colour, intermixed with grey.

Jays build chiefly in woods, where they construct their nests with sticks, fibres of roots, and tender twigs, in which the females deposit from five to six eggs of a dark olive colour. They feed on acorns, as well as every kind of grain, and are very mischievous, frequently destroying young chickens and eggs: nor do they spare birds that have been caught in a trap, or entangled in bird-lime.—The most effectual method of taking them is that already pointed out in the article JACK-DAW.

ICE, a solid, transparent, and brittle body, formed of some fluid matter by the power of cold, or, more properly speaking, by the abstraction of heat.

Ice concretes generally on the *surface* of water; but this effect frequently varies under different circumstances. In the northern parts of Europe, there are three species of ice: 1. That which is formed on the surface. 2. Another kind, which congeals in the *middle* of the water, and bears some resemblance to small hail; and, 3. *Ground-ice*, that is produced at the bottom; especially where it meets with any fibrous substance to which it may adhere. The last species is full of irregular cells; and, on account of its inferior specific gravity, it produces many singular effects, by bringing up heavy bodies from the bottom of the water in which it is formed. The ice that concretes in the middle of the water, rises to the top, where it unites into large masses; the formation, however, both of this, and of the *ground-ice*, takes place only during intense and sudden frosts, in shallow waters, the surface of which is disturbed either by the wind or the current of a stream, so that it cannot be easily consolidated.

In many countries, the warmth of the climate renders ice not only a desirable, but even a necessary article: hence it becomes an object of some importance to procure it in a cheap and easy manner.—For this purpose, in the East Indies, three or four pits are dug on a large open plain, each of which is about thirty feet square, and two feet deep; the bottoms are covered to the depth of eight or ten inches with dried straw, or the stems of sugar-canes. On this bed are arranged, in rows, a number of unglazed pans made of porous earth, about a quarter of an inch thick, and an inch and a quarter deep, which are filled about sun-set, with water that has been boiled and become cool.—Early in the morning, a coat of ice is found on the pans, which is broken by striking an iron hook into its centre, and then conveyed in baskets to the place of preservation.

The most expeditious method, however, of producing ice, consists in a combination of *sal ammoniac* with *nitre*. It was first discovered by Boerhaave, whose experiments were repeated and confirmed by Mr. Walker, apothecary to the Radcliffe Infirmary, Oxford; but he found that his thermometer sunk 32° in a solution of sal ammoniac, when Boerhaave's fell only 28°: nitre alone reduced it to 19°. On mixing the two salts, in equal proportions, the power of generating cold was considerably increased; so that the water was cooled to 22°, while the thermometer stood at 47° in the open air. By adding some powder of the same composition, and immersing in the mixture two small phials filled with water, he found it in a short time frozen.

Having observed that *Glauber's salt*, when it retains the water of crystallization, produces cold in a state of solution, Mr. Walker made an experiment of its effects when mixed with the other salts before mentioned; in consequence of which the thermometer sunk from 69° to 19°, and he obtained ice, while the thermometer stood as high as 70°.—Lastly, by previously immersing the salts in the water of one mixture, and then making another of the cooled materials, he was able to sink the mercury in the thermometer to 64°. Thus, he froze a mixture of spirit of wine and water, in the proportion of seven of the latter to one of the former; and, by adding a quantity of the cooled materials to the mixture in which this was frozen, the quick-silver fell to the extraordinary depth of 69 degrees.

Various other methods of procuring artificial ice have been contrived, particularly by the aid of æther; but that volatile spirit is too expensive for domestic purposes, and a satisfactory account of the process would exceed our limits.

Ice has lately also been introduced into medicine; and its external application was attended with success in various disorders, especially in typhus fever, acute rheumatism, strangulated ruptures, and chronic inflammations of the eyes, after proper evacuations had preceded. It has likewise been advantageously employed for removing a retention of urine; and an instance lately occurred, in which a person was effectually relieved, by immersing his legs for five minutes in a pailful of ice and water taken fresh from the river. At first, it occasioned intense pain, but in a few minutes after the patient had retired to bed, his complaint was alleviated; and, in the course of twelve hours, he was perfectly restored.—Such a powerful remedy, however, should be resorted to only under medical superintendance.

Ice-Boat. See vol. i. p. 299.

Ice-cream, is prepared by mixing three parts of cream with one part of the juice or jam of raspberries, currants, &c. The mixture is then well beaten; and, after being strained through a cloth, is poured into a pewter mould or vessel, adding a small quantity of lemon-juice. The mould is now covered, and plunged in a pail about two-thirds full of ice, into which two handfuls of salt should be previously scattered. The vessel containing the cream is then briskly agitated for eight or ten minutes, after which it is suffered to stand for a similar space of time; the agitation is then repeated, and the cream allowed to subside for half an hour, when it is taken out of the mould, and sent to table.

Ice-house, a repository for the preservation of ice during the summer months.

The situation of an ice-house ought to be towards the south-east, on account of the advantage of the morning sun in expelling the damp air, which is far more prejudicial to it than warmth. The best soil on which such a house can be erected, is a chalk-hill, or declivity, as it will conduct the waste water, without the aid of any artificial drain; but where such land cannot be procured, a loose stony earth, or gravelly soil on a descent, is preferable to any other.

For the construction of an ice-house, a spot should be selected at a convenient distance from the dwelling-house. A cavity is then to be dug in the form of an inverted cone, the bottom being concave, so as to form a reservoir for the reception of waste water. Should the soil render it necessary to construct a drain, it will be advisable to extend it to a considerable length, or, at least, so far as to open at the side of the hill or declivity, or into a well. An air-trap should likewise be formed in the drain, by sinking the latter so much lower in that opening as it is high, and by fixing a partition from the top, for the depth of an inch or two into the water of the drain, by which means the air will be completely excluded from the well. A sufficient number of brick-piers must now be formed in the sides of the ice-house, for the support of a cart-wheel, which should be laid with its convex side upwards, for the purpose of receiving the ice; and which ought to be covered with hurdles and straw, to afford a drain for the melted ice.

The sides and dome of the cone should be about nine inches thick, the former being constructed of *steened brick-work*, that is, without mortar, and with the bricks placed at right angles to the face of the work. The vacant space behind ought to be filled up with gravel, or loose stones, in order that the water oozing through the sides may the more easily be conducted into the well. The doors of the ice-house should likewise be so formed as to shut closely; and bundles of straw ought always to be placed before the inner door, for the more effectual exclusion of air.

The ice to be deposited in this building, should be collected during the frost; broken into small pieces; and properly rammed down, in strata of about one foot thick, so that it may become one complete body:—in those seasons when sufficient quantities of ice cannot be procured, snow may be substituted, and preserved in a similar manner.

JELLY, a form of food, prepared either from the juice of ripe fruits, boiled to a proper consistence with sugar; or without it, from the flesh, intestines, or bones of animals, which are stewed so as to become perfectly stiff and firm when cold.

The jellies of fruits are cooling, and acescent; in all disorders of the first passages, they are of eminent service, especially when diluted with water.—On the other hand, those prepared from animal substances are very nourishing, and useful to invalids. They ought, however, to be uniformly made of *young* meat; as the flesh of old quadrupeds and birds is hard, tough, and productive of a thick glutinous jelly, which is extremely difficult of digestion.

A wholesome jelly may be obtained by boiling a large portion of blanched oats, with some hartshorn shavings and currants, together with a leg of veal cut to pieces, and the bones of which are broken. These ingredients are to be boiled or stewed over the fire, in a sufficient quantity of water, till the whole be reduced to a kind of jelly, which, when strained, and suffered to grow cold, will become firm and elastic. Such a preparation is much used on the Continent, in all hectic disorders, and eaten with broth of snails, or cray-fish. A few spoonfuls of the jelly are taken every morning, diluted with a bason of either of those broths, or any other warm liquor; a dish which furnishes grateful and invigorating aliment to phthisical patients, or those who are afflicted with lingering complaints. Although we are no advocates for *liquid food* in general, which is apt to distend the stomach, and impair the powers of digestion, by not affording them proper exercise; yet such preparations may occasionally be very useful, if conjoined with a due proportion of either well baked bread, or other substantial nutriment.—See also BROTH.

JERUSALEM-ARTICHOKE. See ARTICHOKE.

JESSAMINE. SEE JASMINE.

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